The Bowersock Mills & Power Company
Expanded Kansas River Hydropower Project
LIHI Certificate No: 15

Application for Recertification
for the
Low Impact Hydropower Institute

Prepared and Submitted By:
The Bowersock Mills & Power Co.

Introduction

The Bowersock Mills & Power Company (BMPC) was first established in 1874 as a milling operation on the Kansas River in Lawrence, Kansas. At that time, the City of Lawrence faced an energy crisis, as all the wood within a day's wagon-haul had been harvested, and, as a result, the cost of energy had escalated significantly. Orlando Darling operated a grist mill on the north side of the Kansas River, and, working in collaboration with the City of Lawrence, he agreed to build a dam all the way across the Kansas River. Orlando Darling went broke in his efforts to make the dam hold as did the subsequent company that tried to complete the dam. By that time, the Douglas County Flour Mills had been established on the south side of the river and was operating off the still-standing flume and southernmost masonry portion of the dam. J.D. Bowersock, the operator of the Douglas County Flour Mills, took over the dam project and was able to make the dam hold. Bowersock continued to mill flour from that location as well as to provide mechanical energy for the City of Lawrence. Operations of the mill and mechanical energy generation continued until the flood of 1903 tore out the flour mill building and associated mechanical energy apparatus. Bowersock built a new powerhouse (South Powerhouse) between 1903 and 1905. The South Powerhouse was one of the earliest projects to generate hydroelectric energy in the United States and has continued to generate energy through the present.

Part I. Facility Description

The Bowersock Project consists of a dam and two powerhouses on either end of the dam - the 1905 South Powerhouse and the 2013 North Powerhouse.

Location & Watershed

The Bowersock Mills & Power Company's Expanded Kansas River Hydropower Project (Bowersock) currently operates under the Federal Energy Regulatory Commission (FERC) license P-13526. The project is located on the Kansas River in Lawrence, Kansas. The Kansas River watershed comprises approximately 61,114 square miles which lie in northern Kansas and southern Nebraska, approximately between I-70 and I-80, as far west as eastern Colorado. The Kansas River joins the Missouri River in Kansas City, approximately 50 river miles downstream of the Bowersock project. The Missouri River joins the Mississippi River north of St. Louis, Missouri, and continues to the Gulf of Mexico.

Dam & Operations

The project is a run-of-river operation located on the Bowersock Dam which spans the Kansas River as it passes through downtown Lawrence. The purpose of the Bowersock Dam today is fivefold: protection of the water supply for the City of Lawrence, Kansas; generation of hydroelectric energy; public recreation; protection of existing Kansas Department of Transportation bridge piers; and protection from streambed degradation for the upper reaches of the Kansas River.[1] Since its construction in the late 1800s, the Bowersock Dam has undergone periodic modifications. The dam is 665 feet long from the north side of the flume of the South Powerhouse to the north side of the North Obermeyer Gate which is immediately south

[1] Letter from the Kansas Department of Transportation (KDOT), Michael Orth, P.E., CFM, to the Bowersock Mills and Power Company regarding potential impacts of the removal of the Bowersock Dam. November 26, 2008. "The Kansas River has a sand streambed and sand bars can be seen along much of its length. The river has degraded over time due to several factors including downstream dredging and a long-term lowering of the Missouri River base level. Bowersock Dam has arrested the degradation and kept it from continuing upstream. Removal of the Bowersock Dam would result in further lowering of the bed elevation upstream as the river adjusts. This lowering would impact bridge foundations and berms, channel banks, riparian vegetation, and cropland; not just along the Kansas River, but also along the river's upstream tributaries as they lower to meet the new base level… Removal of Bowersock Dam on the Kansas River in Lawrence could greatly impact not only the adjacent highway bridges but other infrastructure, farmland, natural habitats, the city's water supply, and the levee system which offers flood protection to downtown Lawrence. Impacts to the highway bridges would be significant and KDOT strongly opposes the removal of Bowersock Dam."

of the North Powerhouse on the north side of the river. Dam crest elevation is at 808' NGVD. Due to the age of the dam and a lack of documentation, the exact height of the dam structure cannot be stated. A reasonable estimate of the effective hydraulic dam height may be calculated using the average tailwater elevation at the mean flow of 3,372.9 cfs, which is 790.92' NGVD. Using this figure as the base of the dam, the height of the dam is 17.08 feet. The southern 1/3 of the dam is a masonry block dam and rests on a limestone shelf, which transitions to blue shale 1/3 of the way across the dam starting at the southern end. The south bank of the river consists of glacio-fluvial deposits underlain by bedrock belonging to the Lawrence and Stranger Formations. The south bank is unique in that a portion of the bank is exposed shale and limestone with a buffer of alluvial deposits near the river elevation. The South Powerhouse and southern end of the dam are built on this shale and limestone. The Lawrence Formation is not observed in the northern half of the riverbed due to erosion from the Kansas River. At the north end of the Bowersock Dam the blue shale layer is encountered at 765' NGVD. Historic records and examination of the dam indicate that the masonry blocks at the southern end are composed of limestone. Due to the increasing depth to which the original builders would have had to excavate to place the masonry blocks on bedrock, the northern 2/3 of the Bowersock Dam is timber-crib construction. The entire dam is covered with a concrete cap. The body of the dam is approximately 8 feet in width, and the downstream face of the dam in the timber crib portion has a stair-step structure, which ends in vertical sheet pile wall at various distances from the dam. The entire timber-crib section has been upgraded over time, and is now encased with sheet pile structures both up and downstream of the original structure.

BMPC Millpond and Kansas River

The Kansas River at Lawrence is confined by a levee on the north side of the river which was constructed by the Army Corps of Engineers in 1953. The top of the levee is elevation 833' NGVD at the Bowersock Dam. On the south side, the river is confined by natural bank levels in the range of 815 – 817' NGVD. As Kansas River flow fluctuates significantly, for practical purposes, BMPC and FERC established the "millpond" (defined as the area which is impacted by the existence of the Bowersock Dam) as the area within the existing river banks up to 814' NGVD, which brings the total impoundment to approximately 423 acres. Bowersock is authorized by FERC to maintain the millpond at 813.5' NGVD +/- 6" up to 814' NGVD. At low to median flows up to approximately 6,000 cfs, the plant maintains the Bowersock Millpond by taking units on or offline. As river flows increase beyond 6,000 cfs, Bowersock maintains the millpond level (as per Run-of-River Operations) by progressively lowering gate structures up to approximately 13,050 cfs, at which point Bowersock no longer has control of the river level and the river levels upstream of the Bowersock Dam will exceed 814' NGVD. As defined, the Bowersock Millpond extends 3.3 miles upriver to just beyond the Lawrence Energy Center. The Kansas River has silted in significantly upstream of the Bowersock Dam, resulting in a river-bottom on the upstream face of the dam that as of 2010 measured an average elevation of 805' NGVD across the length of the dam, with an average depth of 3 feet. Based upon HEC-RAS models of the river stretch from 2010, gross storage capacity of the millpond was approximately 3,072 acre feet, with a total usable capacity (net usable storage) of 2,758 acre feet. It should be noted, however, that the depth of the millpond is constantly changing as the Kansas River transports significant amounts of sand and sediment. In more recent years, a significant amount of sediment has moved into the millpond, which has limited the depth of the millpond and associated storage.

Figure 1 – BMPC EKRHP Project

Figure 2 - Bowersock Recreation Site Plan – Revised and Submitted 2019

BMPC Headgate Structures

The top elevation of the Bowersock Dam is 808' NGVD. The authorized millpond height is 813.5' NGVD. BMPC maintains the authorized millpond height of 813.5' NGVD through five separate headgate structures. The South Obermeyer Section consists of fifteen individual 10' Obermeyer Flashboards and is located at the southern end of the dam. The center of the dam is topped by four separate rubber bladders, all of which operate independently from one another. The fifth control structure is the North Obermeyer Gate, which is a 20' gate located at the northernmost end of the dam. A tautline cableway extends from the south side of the BMPC South flume to the north bank of the Kansas River and is used for maintenance purposes and to raise and lower the headgates for the South Powerhouse in the event of high water.

Table 1
BMPC Project Structure Flow Capacities at Elevation 813.5' NGVD
High Head Scenario

Project Section	CFS	CFS
BMPC South Powerhouse		2,300
BMPC North Powerhouse		4,700
BMPC North Obermeyer Gate		1,500
BMPC South Obermeyer Section 1: Gate 1	375	
BMPC South Obermeyer Section 2: Gates 2-3	750	
BMPC South Obermeyer Section 3: Gates 4-7	1,500	
BMPC South Obermeyer Section 4: Gates 8-15	2,625	
BMPC South Obermeyer All Gates		5,250
Total CFS Passage Capacity		**13,250**

*The above chart reflects estimated flows at heads above 21 ft. The North Plant total passage capacity was revised as of 7/2019 as per Professor Bruce McEnroe. At optimum head height, the North Powerhouse can consume as much as 4,700 cfs. At high flows, however, Units 8 & 11 are taken offline, and capacity is reduced. The 2,300 cfs used for the South Powerhouse is the maximum consumption number that has been historically used by the South Powerhouse and is included in all Kansas Division of Water Resources Documentation as a maximum.

BMPC South Powerhouse

The BMPC South Powerhouse has been in operation since 1905. Located at the south end of the dam, the powerhouse is L-shaped and forms the north and east side of the powerhouse intake flume. The facility houses seven turbine/generator units, with turbine units 1-4 on the north wing, and turbine units 5 – 7 on the east wing. The water intake system of the South Powerhouse consists of standard open racks with the following spacing: Unit #1: 1 ¾ in., Units #2 - #6: 2 ¼ in., Unit #7 & partial #6: 2 ½ in. The powerhouse is equipped with monorails for servicing the turbines and generators. The South Powerhouse is in standard operating condition and undergoes continual maintenance.

BMPC North Powerhouse

The BMPC North Powerhouse was put into service on January 1, 2013. The Powerhouse is 154' long and 40' wide with a generator floor elevation of 830' NGVD. A 20' wide, 9.37' tall Obermeyer Gate with a base elevation of 805.63' NGVD is located between the south end of the North Powerhouse and the north end of the dam. The North Obermeyer Gate is used to pass debris as well as to maintain the millpond at the approved level. The Gate is automated and connected to the SCADA system so that it opens and closes to pass or hold back flow.

Zones of Effect

The Bowersock Project has two zones of effect: Zone 1 is the impoundment within the riverbanks upstream of the Bowersock Dam. This is a relatively shallow, silted in millpond with average depths of 3 feet or less. The University of Kansas Boathouse is located approximately ¼ mile upstream of the dam, and the University uses this zone for their rowing pond. Zone 2 is the project tailwater below the dam .92 miles downstream to the City of Lawrence Wastewater Treatment Plant Outfall on the south bank of the river. Zone 2 is shallower with a mix of silt, sand, and rock bottom.

Figure 3 – Zone of Effect 1

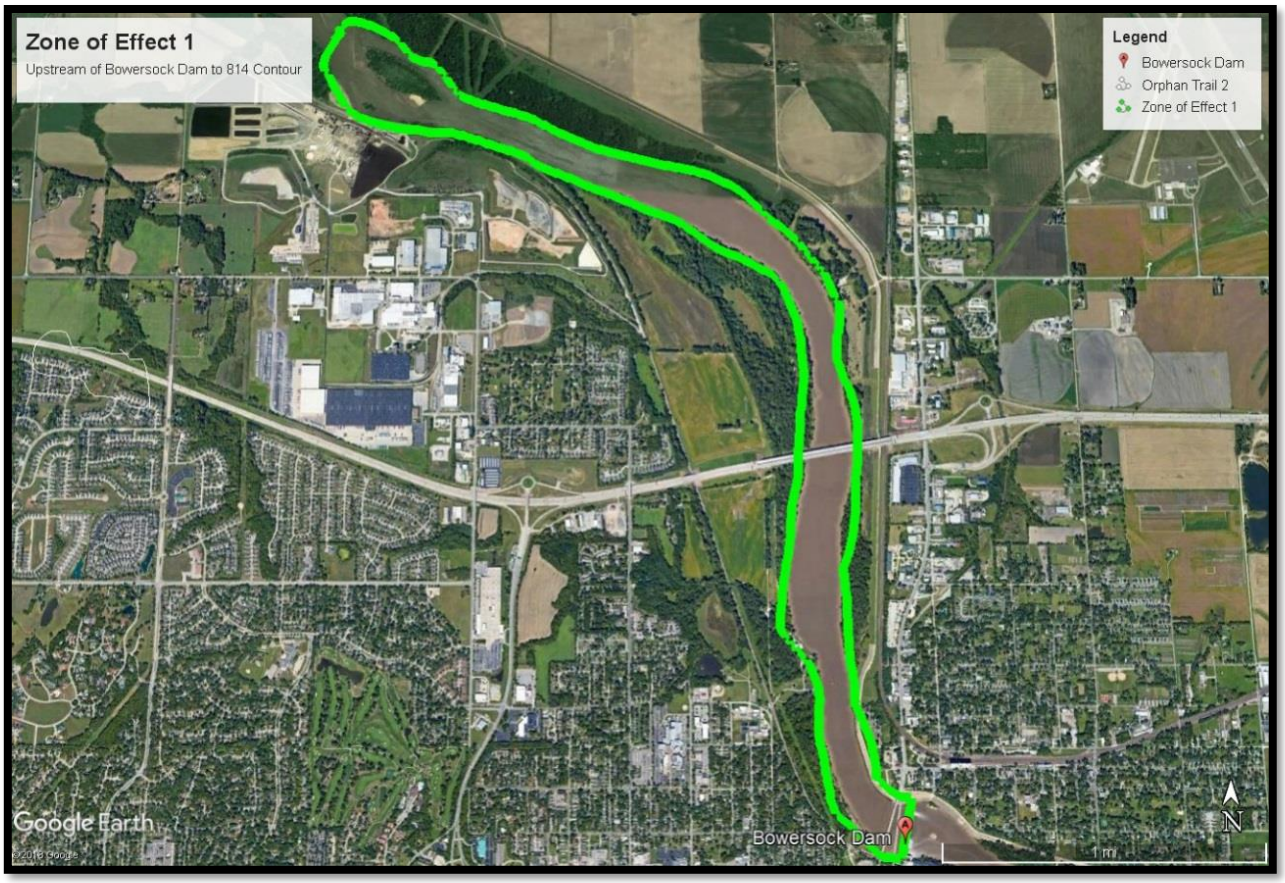


Figure 4 – Zone of Effect 2

Summary of Changes Since Last Certification

Facilities – None
Structures – None
Operations – None
Changes in Facility Requirements – None
Changes in Obligations or Agreements – None

Summary of Status of Conditions:

Condition 1:

The facility owner shall provide LIHI with a brief report on the status and progress on the current recreational plan for the facility. This summary report shall be due as part of the next annual Compliance Report to LIHI. If the progress on the recreational plan is deemed satisfactory at that time, this condition will be removed.

Condition 1 Status: All of the requirements related to the recreational facilities have been completed. The completion of the required facilities was first submitted to FERC on November 11, 2019. In consultation with Mark Ivy, Senior Outdoor Recreation Planner with FERC, Bowersock submitted a supplemental report on December 3, 2019, which included additional photos, an explanation of the facilities, including a site plan, and an explanation for the change in the kiosk design accompanied by supporting letters from the City of Lawrence and the Watkins Museum.

The footpath and canoe portage paths have been placed and are functional. Flooding in 2019 required maintenance of the paths, and this is to be expected going forward at any time there are significant high

water events. The completion of the kiosks was delayed in order that they could be developed with the newly revised Friends of the Kaw logo and to be in keeping with the new style of kiosks that are being installed throughout Lawrence. The kiosks are now installed and fully functional. Mark Ivy has confirmed that the condition has been removed and that Bowersock is in compliance. At the same time, however, he made recommendations for improvements on the submittal. Bowersock will be submitting the updated report in March, 2020.

Figure 5 – 1905 South Powerhouse and Flume

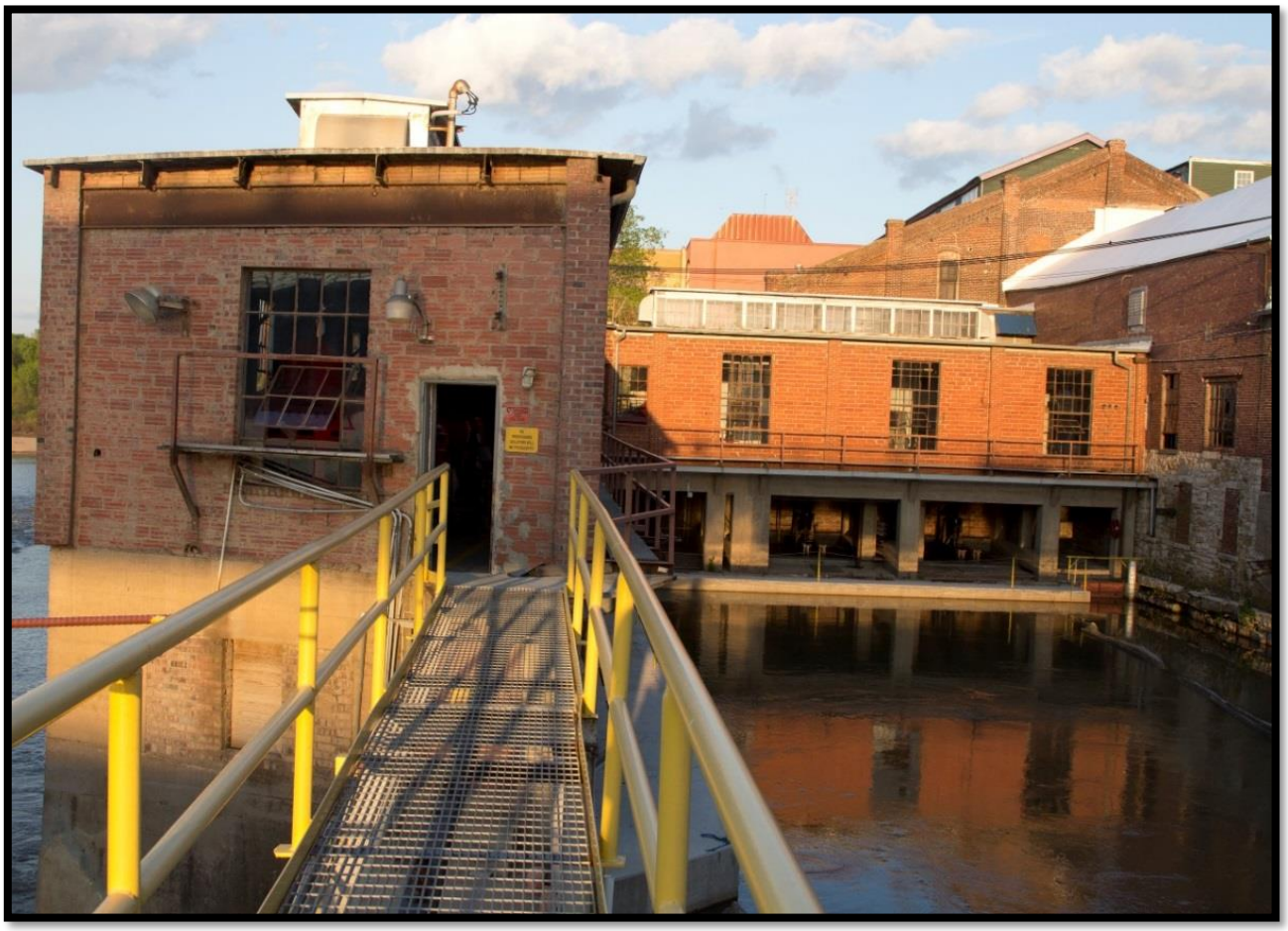


Figure 6 - South Powerhouse View from North

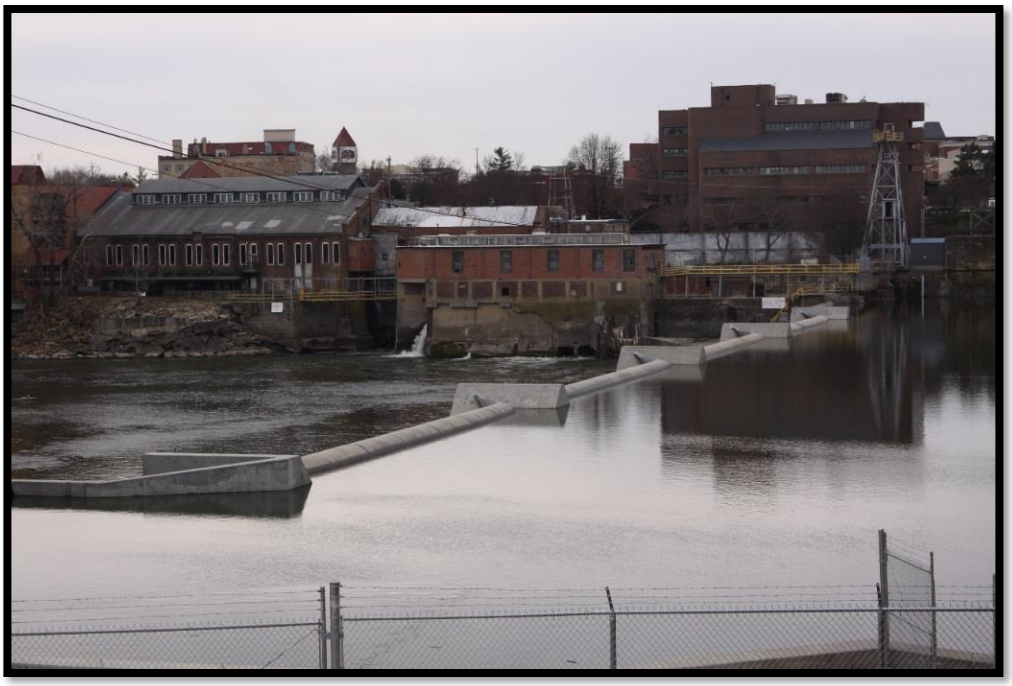


Figure 7 – North Powerhouse from upstream

Figure 8 – North Powerhouse from downstream

Part I

Table B-1.1.

Facility Information for The Bowersock Mills & Power Co. Expanded Kansas River Hydropower Project

Item	*Information Requested*	*Response (include references to further details)*
Name of the Facility	Facility name (use FERC project name or other legal name)	The Bowersock Mills & Power Company Expanded Kansas River Hydropower Project
Location	River name (USGS proper name)	Kansas River
	Watershed name (select region, click on the area of interest until the 8-digit HUC number appears. Then identify watershed name and HUC-8 number from the map at: https://water.usgs.gov/wsc/map_index.html)	Lower Kansas - 10270104
	Nearest town(s), county(ies), and state(s) to dam	Lawrence, Douglas & Jefferson Counties, Kansas
	River mile of dam	52.4
	Geographic latitude of dam	38.974022
	Geographic longitude of dam	95.235078
Facility Owner	Application contact names (Complete the Contact Form in Section B-4 also):	Sarah Hill-Nelson
	Facility owner company and authorized owner representative name. **For recertifications: If ownership has changed since last certification, provide the date of the change.**	The Bowersock Mills & Power Co. Sarah Hill-Nelson
	FERC licensee company name (if different from owner)	N/A
Regulatory Status	FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption	P-13526 Granted August 31, 2010 – 50 Year Term
	FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional")	Major License
	Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments.	See Appendix A: Letter issued December 3rd, 2019. 401 Water Quality Certification Letter issued 4/1/2010 from the Kansas Department of Health and Environment. No amendments.

Item	*Information Requested*	*Response (include references to further details)*
	Hyperlinks to key electronic records on FERC e-library website or other publicly accessible data repositories[1]	See Appendix B: Hyperlinks to key electronic records.
Powerhouse	Date of initial operation (past or future for pre-operational applications)	South Powerhouse – 1874 North Powerhouse – January 1, 2013
	Total installed capacity (MW) **For recertifications: Indicate if installed capacity has changed since last certification**	7 MW No change since recertification in 2014.
	Average annual generation (MWh) and period of record used **For recertifications: Indicate if average annual generation has changed since last certification**	Period of Record 2013 – 2018 Avg. Through 12/2019 22,276,714.1 kWh Expected Average – 32,726,533 kWh *Peak annual production: 30,537,826.3 ** Note adverse river conditions for Period of Record – drought or flood
	Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.) **For recertifications: Indicate if mode of operation has changed since last certification**	Run-of-River No change in mode of operation since recertification in 2014.
	Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit	See Appendix C.
	Trashrack clear spacing (inches), for each trashrack	South Plant Trash Racks Unit 1 – 1 ¾” Units 2-6 – 2 ¼” Unit 7 (& part of #6) – 2 ½” North Plant Trash Racks – 4”
	Dates and types of major equipment upgrades	South Powerhouse: No changes to turbines or generators since 1930s. Switchgear upgrade in July 2017. North Powerhouse: Placed online January 2013. System Upgrages 2014-2016: Generator Cooling; Gate Positioner System; SCADA Controls
	Dates, purpose, and type of any recent operational changes	No operational changes since 2013 when North Powerhouse was put online and none since recertification in 2014.

[1] For example, the FERC license or exemption, recent FERC Orders, Water Quality Certificates, Endangered Species Act documents, Special Use Permits from the U.S. Forest Service, 3rd-party agreements about water or land management, grants of right-of-way, U.S. Army Corps of Engineers permits, and other regulatory documents. If extensive, the list of hyperlinks can be provided separately in the application.

Item	*Information Requested*	*Response (include references to further details)*
	Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments	No plans for any new facility upgrades or license or exemption amendments.
Dam or Diversion	Date of original construction and description and dates of subsequent dam or diversion structure modifications	1874 – Original Construction Ongoing maintenance throughout history but damtop remains 808' NGVD. Original Gate Structures – Flashboards 1993 – Southernmost Obermeyer Gate Section replaces flashboards. 2001 – Obermeyer Flashboards extended to 1st Pier. 2013 – 20' North Obermeyer Gate added in place of Spillway. 2013 – 4 Rubber Dam Bladders replace remaining flashboards.
	Dam or diversion structure height including separately, the height of any flashboards, inflatable dams, etc.	Dam Height: 808' NGVD Maximum Millpond Height extended to 813.5' NGVD +/- 6" through new FERC License P-13526 granted in 2010. Prior authorized millpond height under FERC Exemption (P-2644) was 812' NGVD. New 20' Obermeyer Section and Rubber Bladders fabricated to allow for 813.5' NGVD +/- 6". Extensions welded to legacy Obermeyer Gates and bladders replaced to support additional height. Varying heights on damtop structures (South Obermeyer Sections, 4 Sections of Rubber Dam, and North Obermeyer Gate) allow for millpond to be maintained at authorized level without overtopping.
	Spillway elevation and hydraulic capacity	No spillway. Former spillway (poorly designed and rarely used) replaced with North Powerhouse in 2013.
	Tailwater elevation (provide normal range if available)	Normal Range 790' NGVD – 793' NGVD No changes since recertification.
	Length and type of all penstocks and water conveyance structures between the impoundment and powerhouse	N/A
	Dates and types of major infrastructure changes	2013 – North Powerhouse added to facility. No changes since 2014 recertification.

Item	*Information Requested*	*Response (include references to further details)*
	Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.)	Hydropower and City of Lawrence Water Supply. Ancillary beneficiaries include University of Kansas Rowing and other upstream users including Evergy Lawrence Energy Center.
	Source water	Kansas River
	Receiving water and location of discharge	Bowersock Dam: Receiving upstream of dam and discharging below through North and South Powerhouses. SW Quarter of the NE Quarter of the SW Quarter (also described as 1,700 feet North and 3,330 feet West of the southeast corner of Section 30, Township 12 South, Range 20 East, in Douglas County, Kansas)
Conduit	Date of conduit construction and primary purpose of conduit	N/A
Impoundment and Watershed	Authorized maximum and minimum water surface elevations **For recertifications: Indicate if these values have changed since last certification**	Maximum: 814' NGVD until flow exceeds capacity to control Minimum: 813' NGVD Increase in maximum millpond height granted through full FERC License P-13526 which was required for the addition of the North Powerhouse. No changes since 2014 recertification.
	Normal operating elevations and normal fluctuation range **For recertifications: Indicate if these values have changed since last certification**	Millpond: 813' – 814' NGVD. Authorized level 813.5' +/- 6". With spring flows the millpond commonly reaches 817' NGVD+, with a recent maximum flood elevation of 827.64' NGVD in 1993. No changes since 2014 recertification.

Item	*Information Requested*	*Response (include references to further details)*
	Gross storage volume and surface area at full pool **For recertifications: Indicate if these values have changed since last certification**	No change since 2014 recertification. Gross Volume at 813.5' NGVD: 3,072 AF Reservoir Surface Area: 423 Acres *Based on HEC-RAS models of the corresponding river reach. Through FERC License P-13526 the "millpond" of the project was defined as the area upstream of the dam within the existing river banks up to Elev. 814' NGVD. The 814' NGVD Contour line crosses the Kansas River immediately downstream of Baldwin Creek at River Mile 55.7 just upstream of the Evergy Lawrence Energy Center. Normal maximum millpond level is 813.5' NGVD. The increase in millpond height impacted the millpond at low flows, as it extended the impact upstream by .5 miles from the previous max extent when maximum millpond level was 812' NGVD. The new increase in millpond height extended the impact upstream, but did not alter the channel of the millpond, as the millpond remains contained within the banks of the Kansas River at all levels at which it can be controlled by BMPC operations.
	Usable storage volume and surface area **For recertifications: Indicate if these values have changed since last certification**	BMPC is a run-of-river project and passes all riverflows so there is no "usable storage." Any storage is incidental. No changes since 2014 recertification.
	Describe requirements related to impoundment inflow, outflow, up/down ramping and refill rate restrictions.	The BMPC Project is a run-of-river project and is required to maintain river flows as recorded at the upstream Lecompton Gauge. Compliance with inflows and outflows is monitored by millpond level, as BMPC is required to hold the millpond at 813.5' NGVD +/- 6".

Item	*Information Requested*	*Response (include references to further details)*
	Upstream dams by name, ownership and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage.	The dams of significance upstream of Bowersock are on tributaries, none of which are FERC-licensed. There are no upstream dams with downstream fish passage. All significant upstream dams and reservoirs are owned and managed by the Army Corps of Engineers. Perry Dam – Delaware River Mile 5.3 Tuttle Creek Dam – Blue River Mile 10 Milford Dam – Republican River Mile 8.3 There are two low head weirs upstream of Bowersock. Tecumseh Power Plant Weir Owner: Evergy – Kansas River Mile 75 Topeka Water Department Weir Owner: City of Topeka - KS River Mile 87
	Downstream dams by name, ownership, river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage	Johnson County Water One Weir – Johnson County Water One – Kansas River Mile 15 Owner: Johnson County Water One This is a low water weir designed to inundate water intakes for Johnson County Water One. It is not a complete dam and no upstream fish passage is necessary.
	Operating agreements with upstream or downstream facilities that affect water availability and facility operation	N/A
	Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control.	As a run-of-river project, Bowersock exerts limited control over the river. The FERC Project Boundary Area is approximately 664 acres, which includes the river and a 200-foot zone extending around the area.
Hydrologic Setting	Average annual flow at the dam, and period of record used	The Kansas River has significant variation in flow, and for practical purposes Bowersock finds the median flow more meaningful. The median flow of the Kansas River at the Bowersock Dam is 3,400 cfs. Bowersock uses the Lecompton Gauge upstream as that gauge has been in place longer and is more accurate. Annual flow varies significantly from year to year.

Item	*Information Requested*	*Response (include references to further details)*
	Average monthly flows and period of record used	Mean of Monthly Discharge Period of Record 1936-2018 Lecompton Gauge January – 2,810 cfs February – 4,230 cfs March – 6,460 cfs April – 8,460 cfs May - 10,500 cfs June – 14,200 cfs July – 11,100 cfs August – 6,480 cfs September - 5,920 cfs October – 5,350 cfs November – 4,070 cfs December – 3,610 cfs
	Location and name of closest stream gauging stations above and below the facility	**Upstream Gauge:** The USGS cfs gauge at Bowersock Dam was installed in 2012, and we have not found it to be accurate with regard to cfs as it measures outflow from the project only on one side of the river. We continue to use the Lecompton Gauge as the most reliable upstream cfs gauge. Kansas River at Lecompton USGS Gauge # 06891000 Jefferson County, Kansas Hydrologic Unit Code 10270104 Latitude 39°03'04", Longitude 95°23'10" NAD27 Drainage area 58,460 square miles Gage Datum 821.84 feet above NGVD29 **Downstream Gauge:** Kansas River at DeSoto Leavenworth County, Kansas Hydrologic Unit Code 10270104 Latitude 38°59'00", Longitude 94°57'52" NAD27 Drainage area 59,756 square miles Gage datum 753.87 feet above NGVD29

Item	*Information Requested*	*Response (include references to further details)*
	Watershed area at the dam (in square miles). Identify if this value is prorated and provide the basis for proration.	The most recent assessment of the Kansas River Watershed identified it as 58,500 square miles. This is not a prorated number.
Designated Zones of Effect	Number of zones of effect	Two
	Upstream and downstream locations by river miles	Zone 1: RM 52.4 to RM 55.7 Zone 2: RM 52.4 to RM 51.48
	Type of waterbody (river, impoundment, bypassed reach, etc.)	Zone 1: Impoundment Zone 2: Powerhouse Tailwater
	Delimiting structures or features	Zone 1: Impoundment headwater from Bowersock Dam upstream to project boundary where 814' contour line crosses the Kansas River from bank to bank at RM 55.7 Zone 2: Bowersock Dam downstream .92 miles to City of Lawrence Wastewater Treatment Plant Discharge
	Designated uses by state water quality agency	Kansas Designations Aquatic Life - Special Livestock Watering – Designated Industrial Supply - Designated Irrigation Supply - Designated Food Procurement - Designated Domestic Water Supply - Designated Groundwater Recharge - Designated Primary Contact Recreation – Class B
Pre-Operational Facilities		
Expected operational date	Date generation is expected to begin	N/A
Dam, diversion structure or conduit modification	Description of modifications made to a pre-existing conduit, dam or diversion structure needed to accommodate facility generation. This includes installation of flashboards or raising the flashboard height. Date the modification is expected to be completed	N/A
Change in water flow regime	Description of any change in impoundment levels, water flows or operations required for new generation	N/A

Part II – Standards Selection

The BMPC Expanded Kansas River Hydropower Project offers two designated zones of effect for this application.

Zone One is defined as the impoundment within the riverbanks upstream of the Bowersock Dam. This zone extends 3.3 miles upriver from the dam (located at river mile 52.4) to the upstream project boundary at river mile 55.7. For the purposes of the BMPC EKRHP the FERC project boundary was established based on an analysis of the point at which impacts of the Bowersock Dam would no longer be measurable. The Bowersock Millpond has a maximum height of 814', and the 814' contour line crosses the Kansas River 3.3 miles upstream of the dam. The millpond is a relatively shallow, silted in millpond with average depths of 3 feet or less. The University of Kansas Boathouse is located approximately ¼ mile upstream of the dam and the University uses this zone for their rowing pond.

Zone Two is defined as the tailwater area below the Bowersock Dam extending .92 miles downstream to the City of Lawrence Wastewater Treatment Plant Outfall on the south bank of the river. Zone Two is shallower than Zone One, with a mix of silt, sand, and rock bottom.

Table B-1.2. Matrix of Alternative Standards Template.

Facility Name: BMPC Expanded Kansas River Hydropower Project Zone of Effect: No. 1 Upstream

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		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				
H	**Recreational Resources**		X			

Facility Name: BMPC Expanded Kansas River Hydropower Project Zone of Effect: No. 2 Downstream

		Alternative Standards				
	Criterion	***1***	***2***	***3***	***4***	***Plus***
A	**Ecological Flow Regimes**	X				
B	**Water Quality**		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				
H	**Recreational Resources**		X			

PART III

B.2.1 Ecological Flow Standards

Table B-1. Information Required to Support Ecological Flows Standards.
Zone 1 and Zone 2

Criterion	*Standard*	*Instructions*
A	1	Not Applicable / De Minimis Effect: • Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility. • For run-of-river facilities, provide details on operations and demonstrate that flows, water levels, and operation are monitored to ensure such an operational mode is maintained. If deviations from required flows have occurred, discuss them and the measures taken to minimize reoccurrence. • In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody. • For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and 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.

Criterion A (Ecological Flow Regimes) – Supporting Information:
Not Applicable/ De Minimis Effect:

- The Expanded Kansas River Hydropower Project (Bowersock) consists of two powerhouses located on the north and south ends of the Bowersock Dam. The Bowersock Dam is 664 feet long, and the powerhouses abut both ends of the structure. There are no bypassed reaches at the facility. See Figure 8 – Bowersock Site Plan – 2019 Revision Including Completed Recreation Amenities.
- The Bowersock facility is a run-of-river operation and has always operated as such. The facility operates run-of-river as per FERC License P-13526. For details on operations see Appendix D - BMPC Revised Project Operations Monitoring Plan (POMP) March 28, 2015. The North Obermeyer gate is automated to ensure flows remain within the approved window. When flows rise or fall precipitously (in excess of North Obermeyer Gate Capacity (1,500 cfs)), staff is alarmed to address the issue. For increases in flow, the rubber dams are automated such that sections 1-4 deflate sequentially to pass excess water. Rapid and significant decreases in flow are rare and are addressed via SCADA alarms which indicate that the millpond is facing a

potential compliance issue. BMPC maintains an on-site apartment so that the facility is under nearly 24/7 supervision. Operators are required to live within 15 minutes of the plant to address issues in a timely manner.

- Conduit Facility – N/A
- The water in the impoundment zone (Zone of Effect 1) is managed as per the POMP. The millpond (Zone 1) is maintained at 813.5' +/- 6". Upstream flows are passed to maintain millpond level in compliance. With the exception of deviations for maintenance, water is managed via unit deployment and management of headgate structures (Obermeyer Gates & rubber dams) to maintain run-of-river flows downstream of the dam as dictated by nature and releases by upstream reservoirs. Fish and wildlife habitat are not actively evaluated or managed.
- Zone 2 is managed in the same run-of-river manner, and flows reflect the upstream flows as dictated by nature and releases by upstream reservoirs.

Source and Date: FERC License P-13526 Granted August 19, 2010. BMPC Revised Project Operations Monitoring Plan (POMP) March 28, 2015. See Appendix D. Confirms run-of-river operations.

Figure 8 – Bowersock Site Plan – 2019 Revision to Include Completed Recreation Amenities

B.2.2 Water Quality Standards

Table B-2. Information Required to Support Water Quality Standards.

Zone 1 and Zone 2

Criterion	*Standard*	*Instructions*
B	2	Agency Recommendation: • If facility is located on a Water Quality Limited river reach, provide a link to the state's most recent impaired waters list and indicate the page(s) therein that apply to facility waters. If possible, provide an agency letter stating that the facility is not a cause of such limitation. • Provide a copy of the most recent Water Quality Certificate and any subsequent amendments, including the date(s) of issuance. If more than 10 years old, provide documentation that the certification terms and conditions remain valid and in effect for the facility (e.g., a letter from the agency). • Identify any other agency recommendations related to water quality and explain their scientific or technical basis. • Describe all compliance activities related to water quality and any agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations.

Criterion B (Water Quality Standards) – Supporting Information:
Agency Recommendation:

- The facility is located in the Lower Kansas River as defined by the Kansas Department of Health and Environment (KDHE). The Kansas River is designated as Water Quality Limited in the stretch both upstream and downstream of the Bowersock Dam. Kansas Department of Health and Environment 2018 303(d) List of All Impaired & Potentially Impaired Waters http://www.kdheks.gov/tmdl/2018/Approved_2018_303_d)_List_of_All_Impaired_Waters.pdf Relevant Sections: Lower Kansas pages 7-10. See Appendix A – Letter From Tom Stiles, Kansas Department of Health and Environment dated 12/3/2019 stating that the Bowersock Facility is not the cause of the above-referenced limitations.
- The most recent Water Quality Certificate for the Bowersock Project is the 401 Water Quality Certification procured for the construction of the North Powerhouse dated April 1, 2010. See Appendix A. BMPC is in compliance with the 2010 Water Quality Certificate. An updated Spill Prevention and Response Plan has been completed since that time. See Appendix A.
- Additional agency recommendations related to water quality include the following:
    - A wastewater permit from the Kansas Department of Health and Environment. Through the early operations of the North Powerhouse (2013 – 2016), Bowersock implemented various methods of cooling for the North Powerhouse Generators 8 – 11. In the fall of 2015, Bowersock applied for a Kansas Water Pollution Control Permit and Authorization to Discharge under the National Pollutant Discharge Elimination System (NPDES). The permit was granted on October 15, 2015. Under the current configuration, Bowersock uses river water to cool Units 9 and 10, and city water to cool Units 8 and 11.

Bowersock operates within the terms of this permit. See Appendix E Water Quality Standards Additional Documentation.

- KDHE submitted a determination letter dated 10/12/2018 regarding Bowersock's compliance with the Clean Water Act Section 316(b). See Appendix E Water Quality Standards Additional Documentation.

- Bowersock's compliance obligations with regard to the monitoring of water quality during plant operations (post construction) include the following:
  - 401 Water Quality Certification – See Appendix A.
    - Notification to the designated authorities regarding any spill of fuel or discharge of pollutants
    - A Spill Prevention and Response Plan should be prepared and include reportable quantity limits. See Appendix A.
  - NPDES Permit
    - Monthly inspection of the outfall (downstream) to ensure compliance with Water Quality Standards. As per the permit, Bowersock maintains a log documenting monitoring and inspections performed.
    - Any violation of Water Quality Standards shall be reported within 24 hours of discovery and subsequently documented as per the permit.

Source and Date: FERC License P-13526 Granted 2010. 401 Water Quality Certification issued by Kansas Department of Health and Environment (KDHE) April 1, 2010. See Appendix A.

Kansas Water Pollution Control Permit and Authorization to Discharge under the National Pollutant Discharge Elimination System (NPDES) granted October 15, 2015. See Appendix E.

B.2.3 Upstream Fish Passage Standards

Please provide a list all migratory fish species (anadromous, catadromous, and potamodromous species) that occur now or have occurred historically at the facility.

Fish species present in the Kansas River include fresh-water almost exclusively non-migratory species with the exception of the American Eel.

Anadromous Fish
Anadromous fish are species that upon maturity migrate from the ocean into freshwater environments to spawn. No anadromous fish occur in the Kansas River.

Catadromous Fish
Catadromous fish are species that live most of their lives in freshwater environments and, upon reaching sexual maturity, migrate to the ocean to spawn. The juvenile offspring of catadromous fish migrate through the ocean to the mouths of rivers and move upstream to various habitats to live until adulthood. There is one catadromous fish that has been documented in the Kansas River.

- American Eel

Potamodromous Fish

Potamodromous fish are species that are born in upstream freshwater habitats, then migrate downstream (still in freshwater) as juveniles to grow into adults before emigrating back upstream to spawn. Although the specific spawning mechanisms of many fish in the Kansas River have not been documented, the following table includes all known non-anadromous and non-catadromous species identified in the Kansas River that could potentially be affected by the Bowersock Dam and project operations.[1]

Figure 9. Fish and Aquatic Species Identified in the Kansas River to the Riley County Line

COMMON NAME (*SCIENTIFIC NAME)*	AT DAM SITE	DOWNSTREAM TO MOUTH	UPSTREAM TO RILEY CO. LINE
LAMPREYS (FAMILY PETROMYZONTIDAE)			
Chestnut Lamprey (*Ichthyomyzon casteaneus)*	-	*	+
STURGEONS (FAMILY ACIPENSERIDAE)			
Lake Sturgeon (*Acipenser fulvescens)*	+	?	?
Pallid Sturgeon (*Scaphirhynchus elbus*)	*	*	-
Shovelnose Sturgeon (*Scaphirhynchus platorynchus*)	*	*	*
PADDLEFISHES (FAMILY POLYODONTIDAE)			
Paddle fish (*Polydon spathula)*	*	*	*
GARS (FAMILY LEPISOSTIDAE)			
Longnose Gar (*Lepisosteus osseus*)	*	*	*
Shortnose Gar (*Lepisosteus platostomus*)	*	*	*
HERRINGS (FAMILY CLUPEIDAE)			
Skipjack Herring (*Alosa chrysochloris*)	*	*	-
Gizzard Shad (*Dorosome cepedianum*)	*	*	*
MOONEYES (FAMILY HIODONTIDAE)			
Goldeye (*Hiodon alosoides*)	*	*	*
MINNOWS (FAMILY CYPRINIDAE)			
Stoneroller (*Campostoma anomalum*)	*	*	*

[1] Brian K. Wagner, *Exhibit E. Environmental Report, Bowersock Dam. Lawrence, Kansas*, November 1984

Goldfish (*Caressius auratus*)	-	*	*
Carp (*Cyprinus carpio*)	*	*	*
Western Silvery Minnow (*Hybognathus argyritis*)	*	*	*
Plains Minnow (*Hybognathus placitus*)	*	*	*
Speckled Chub (*Hybopsis aestivalis*)	*	*	*
Sturgeon Chub (*Hybopsis gelida*)	*	*	*
Flathead Chub (*Hybopsis gracilis*)	*	*	-
Sicklefin Chub (*Hybopsis meeki*)	*	*	-
Silver Chub (*Hybopsis storeriana*)	*	*	*
Golden Shiner (*Notemigonus crysoleucas*)	*	*	*
Emerald Shiner (*Notropis atherinoides*)	*	*	*
River Shiner (*Notropis blennius*)	*	*	+
Common Shiner (*Notropis cornetus*)	*	-	*
Bigmouth Shiner (*Notropis dorsaliss*)	*	*	-
Red Shiner (*Notropis lutrensis*)	*	*	*
Rosyface Shiner (*Notropis rubellus*)	*	-	-
Silverband Shiner (*Notropis shumardi*)	-	-	+
Sand Shiner (*Notropis stramineus*)	*	*	*
Redfin Shiner (*Notropis umbratilis*)	*	*	*
Suckermouth Minnow (*Phenacobius mirabilis*)	*	*	*
Bluntnose Minnow (*Pimephales notatus*)	*	*	*
Fathead Minnow (*Pimephales promelas*)	*	*	*
Bullhead Minnow (*Pimephales vigilax*)	*	*	*
Creek Chub (*Semotilus atromaculatus*)	*	*	*
SUCKERS (FAMILY CATOSTOMIDAE)			
River Carpsucker (*Carpiodes carpio*)	*	*	*
Quillback (*Carpiodes cyprinus*)	*	*	*
Highfin Carpsucker (*Carpiodes velifer*)	+	*	+

White Sucker (*Catostomus commersoni*)	+	*	*
Blue Sucker (*Cycleptus elongatus*)	*	*	+
Smallmouth Buffalo (*Ictiobus bubalus*)	*	*	*
Bigmouth Buffalo (*Ictiobus cyprinellus*)	*	*	*
Black Buffalo (*Ictiobus niger*)	*	*	*
Shorthead Redhorse (*Moxostema mecrolepidotum*)	*	*	*
CATFISHES (FAMILY ICTALURIDAE)			
Blue Catfish (*Ictalurus furcatus*)	*	-	-
Black Bullhead (*Ictalurus melas*)	*	*	*
Yellow Bullhead (*Ictalurus natalis*)	+	-	+
Channel Catfish (*Ictalurus punctatus*)	*	*	*
Slender Madtom (*Noturus exilis*)	-	*	-
Stonecat (*Noturus flavus*)	*	*	*
Flathead Catfish (*Pylodictis olivaris*)	*	*	*
CODFISHES (FAMILY GADIDAE)			
Burbot (*Lota lota*)	+	-	-
KILLIFISHES (FAMILY CYPRINODTIDAE)			
Plains Killifish (*Fundulus kansae*)	*	-	*
MOSQUITOFISHES (FAMILY POECILIIDAE)			
Mosquitofish (*Gambusia affinis*)	*	-	*
TEMPERATE BASSES (FAMILY PERCHICHTHYIDAE)			
White Bass (*Morone chrysops*)	*	*	*
SUNFISHES (FAMILY CENTRARCHIDAE)			
Green Sunfish (*Lepomis cyanellus*)	*	*	*
Orangespotted Sunfish (*Lepomis humilis*)	*	*	*
Bluegill (*Lepomis macrochirus*)	*	*	*
Longear Sunfish (*Lepomis megalotis*)	-	*	-
Largemouth Bass (*Micropterus salmoides*)	*	*	*

White Crappie (*Pomoxis annularis*)	*	*	*
Black Crappie (*Pomoxis nigromaculatus*)	*	*	*
PERCHES (FAMILY PERCIDAE)			
Orangethroat Darter (*Etheostoma spectabile*)	-	*	-
Logperch (*Percine caprodes*)	-	*	-
Sauger (*Stizostedion canadense*)	*	*	+
Walleye (*Stozostedion vitreum*)	*	*	+
DRUMS (FAMILY SCIAENIDAE)			
Freshwater Drum (*Aplodinotus grunniens*)	*	*	*

- no record,
* collection record since 1915
+ collection record prior to 1915

? unknown

Table B-3. Information Required to Support Upstream Fish Passage Standards.

Zone 1

Criterion	*Standard*	*Instructions*
C	1	Not Applicable / De Minimis Effect: • Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement. • 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.

Zone 1 Criterion C (Upstream Fish Passage) – Supporting Information:
Not Applicable/ De Minimis Effect:

- The facility does not impose a barrier to upstream fish passage in Zone 1 because it is above the dam and the dam is the only impediment.
- There is minimal data or documentation regarding fish distribution in the region. The following websites provide some guidance.
    - http://www.kansasriverkeeper.com/river-atlas/conservation-priorities/fish-conservation
    - http://kansasecomeet.org/ecomeet/wp-content/uploads/2012/05/SFPocketGuide.pdf

- Migratory Fish Species in the Vicinity
    - The American Eel (*Anguilla rostrata*), a catadromous fish species, has been historically reported. According to a technical report of the Kansas Biological Survey there are records dating as far back as the 1870s of the presence of the American Eel in the Kansas River. The American Eel has not been declared extirpated or extinct by the state or federal government. The Kansas Biological Survey database designates the species as "relatively rare" (i.e., it is not designated as extirpated). American Eel presently move through the facility area on an incidental basis, likely associated with infrequent periods of very high flows. In 1994, state wildlife and parks staff reported to a FWS official in a nearby FWS field office a specimen caught 120 miles upstream of the facility subsequent to the massive Midwest floods of 1993. The FWS official said he received anecdotal information from fishers about landings below the facility. State agency officials' records indicated a finding in 1987, though information about the location of that finding was not readily available. The most recent finding of an American Eel in the Kansas River was on September 11, 2015. In a letter dated December 17, 2019, Jordan Hofmeier, Aquatic Ecologist for the Kansas Department of Wildlife, Parks and Tourism (KDWPT) confirmed the 2015 American Eel finding, as well as additional observations in Milford Fish Hatchery upstream of the Bowersock Dam. Hofmeier noted that "American Eel are considered a Species of Greatest Conservation Need in the Kansas Wildlife Action Plan, but that designation does not carry any regulatory protection. Given the paucity of recent observations of American Eels in the Kansas River Basin and the lack of state protective status applied to the species, [KDWPT] does not require any passage measures to be implemented at this time."

- There is no evidence to suggest that the Bowersock Dam has any measurable impact on current American Eel populations in the Kansas River.
- See Appendix F which includes letters from the Kansas Department of Wildlife, Parks, and Tourism and the US Fish and Wildlife Service.

Table B-4. Information Required to Support Upstream Fish Passage Standards.
Zone 2

Criterion	***Standard***	***Instructions***
C	2	<u>Agency Recommendation:</u> • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is or is not part of a Settlement Agreement. • Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented.

<u>Zone 2 Criterion C (Upstream Fish Passage) – Supporting Information:</u>
<u>Agency Recommendation</u>

- The Bowersock Dam is subject to recommendations from both the US Fish and Wildlife Service

and the Kansas Department of Wildlife, Parks and Tourism. The Bowersock Dam has been identified by natural resource agencies as a barrier to upstream migration by fish species under nearly all conditions with the exception of significant flood. In a Water-Supply Paper produced by the US Geological Survey, a report on the impacts of commercial dredging on the fishery of the lower Kansas River, Frank Cross and Jerry deNoyelles was cited, and note that "this dam is a barrier to upstream fish migration. The dam's greatest effect is on those fish species that inhabit the lower part of the Kansas River and would otherwise migrate upstream to spawn. Most of the affected species, such as the channel catfish, flathead catfish, walleye, and white bass, are still able to spawn at sites upstream of the dam or are present in the river because they are stocked in tributary lakes. However, three species, the blue sucker, paddlefish, and sauger, are no longer found or are rare upstream of the dam." [2] Since the original LIHI certification in 2004, both federal and state agencies have recommended that fish passage NOT be implemented at the Bowersock Dam to prevent additional spread of invasive species in the Kansas River. This recommendation has continued since that time, with the most recent letters maintaining that recommendation dated December 10, 2019, from the US Fish and Wildlife Service and December 17, 2019, from the Kansas Department of Wildlife, Parks and Tourism. See Appendix F which includes both letters.

- The scientific and technical basis on which the recommendation has been made is documented in both the USFWS and KDWPT letters, with the most specific data provided in the KDWPT letter, which notes that although the "Bowersock Dam undoubtedly acts as a barrier to upstream fish passage in the Kansas River… the dam currently operates as in impediment to the spread of Silver and Bighead Carp (collectively, Asian Carp)." For that reason, an aquatic organism passage structure is "currently discouraged." See Appendix F.
- KDWPT is actively monitoring fish populations upstream of the Bowersock Dam, and notes that "as of the writing of this letter, a total of 6 Bighead Carp have been documented above Bowersock Dam. Based on their sizes and some aging analysis, it is currently believed those fish moved above the dam during the 1993 flood. Regular electrofishing samples have been conducted above the dam most years since 2012, with intensive efforts in 2018 and 2019. Samples of stilling basins upstream of the dam during fish salvages have not yielded Asian Carp. No evidence of reproduction or recruitment has been documented. Recent eDNA samples from 2012 and 2018 were negative (2019 results pending), further indicating there is not an established population of Asian Carp above Bowersock Dam." The agency does note that "If Asian Carp become established above Bowersock Dam, the value of the structure as a barrier to invasive species could become questionable." See Appendix F.

B.2.4 Downstream Fish Passage and Protection Standards

In addition to the migratory species list provided for Criterion C above, please provide a list all riverine fish species that occur now or have occurred historically at the facility.

[2]Jordan,P.R, and J.K. Stamer, 1986. National Water-Quality Assessment. United States Geological Survey Water-Supply Paper 2352-B. Department of the Interior. P. 154

See Figure 9 for a complete list of fish and aquatic species that occur now or have occurred at the facility. Historic alterations in the Kansas River have significantly affected fish composition and aquatic resources. Once dominated by native riparian corridor and agricultural lands, the areas adjacent to the Kansas River now exhibit more urban development with an increase in channelization for the purpose of flood management. The channelization of the River has created a segregation of fish species based on their tolerance to localized water quality, turbidity, and velocity. Lower reaches of the Kansas River below the Bowersock Dam contain more macrohabitat generalist and tolerant species including: channel catfish, freshwater drum, common carp, largemouth bass, and white crappie, which are species that prefer low velocity habitats. Fish species in the upper reaches of the Kansas River tend to be more fluvial specialists such as: blue sucker, central stoneroller, flathead catfish, sand shiner, shovelnose sturgeon, and shorthead redhorse. [3]

Table B-5. Information Required to Support Downstream Fish Passage Standards.
Zone 1 – Upstream of Dam

Criterion	*Standard*	*Instructions*
D	2	Agency Recommendation: • Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective). • Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is part of a Settlement Agreement or not. • Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented.

Zone 1 Criterion D (Downstream Fish Passage) – Supporting Information:
Agency Recommendation:

- The Bowersock Dam is subject to recommendations from both the US Fish and Wildlife Service and the Kansas Department of Wildlife, Parks and Tourism. Since the original LIHI certification in 2004, both federal and state agencies have recommended that fish passage NOT be implemented at the Bowersock Dam to prevent additional spread of invasive species in the Kansas River. This recommendation has continued since that time, with the most recent letters maintaining that recommendation dated December 10, 2019, from the US Fish and Wildlife Service and December 17, 2019, from the Kansas Department of Wildlife, Parks and Tourism. See Appendix F which includes both letters.
- The scientific and technical basis on which the recommendation has been made is documented in both the USFWS and KDWPT letters, with the most specific data provided in the KDWPT letter, which notes that although the "Bowersock Dam undoubtedly acts as a barrier to upstream fish passage in the Kansas River… the dam currently operates as in impediment to the spread of Silver and Bighead Carp (collectively, Asian Carp)." For that reason, an aquatic organism passage structure is "currently discouraged." See Appendix F.

[3] Cross, F.B., J.T. Collins, 1975. *Fisheries in Kansas*. University of Kansas Museum of Natural History Publication.ed.ser.3:1-189. 1995. *Fisheries in Kansas, Second Edition*, University of Kansas Museum of Natural History Publication.ed.ser.14:1-315.

- KDWPT is actively monitoring fish populations upstream of the Bowersock Dam, and notes that "as of the writing of this letter, a total of 6 Bighead Carp have been documented above Bowersock Dam. Based on their sizes and some aging analysis, it is currently believed those fish moved above the dam during the 1993 flood. Regular electrofishing samples have been conducted above the dam most years since 2012, with intensive efforts in 2018 and 2019. Samples of stilling basins upstream of the dam during fish salvages have not yielded Asian Carp. No evidence of reproduction or recruitment has been documented. Recent eDNA samples from 2012 and 2018 were negative (2019 results pending), further indicating there is not an established population of Asian Carp above Bowersock Dam." The agency does note that "if Asian Carp become established above Bowersock Dam, the value of the structure as a barrier to invasive species could become questionable." See Appendix F.

Table B-6. Information Required to Support Downstream Fish Passage Standards.
Zone 2 – Downstream of the Dam

Criterion	***Standard***	***Instructions***
D	1	<u>Not Applicable / De Minimis Effect:</u> • 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). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration. • 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. • 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.

<u>Zone 2 Criterion D (Downstream Fish Passage) – Supporting Information:</u>
<u>Not Applicable/De Minimis Effect:</u>

- The facility does not impose a barrier to downstream fish passage in Zone 2 because Zone 2 is below the dam and there are no other Bowersock-related impediments below the dam.
- As a run-of-river operation, Bowersock does not alter the flow in the river, so any changes in flow below the dam are a result of natural rainfall or upstream reservoir releases.
- There is no evidence that the Bowersock Facility adversely contributes to the sustainability of any riverine fish populations downstream of the dam or to their access to habitat necessary for successful completion of their life cycles. "In its natural state, the lower Kansas River has limited habitat diversity, consisting primarily of shallow flows over a nearly flat, sandy bed… the fish community is dominated by a few species well adapted to occupy shallow water over sandy

substrates and feed on microorganisms or detritus." [4]

- See B.2.3 and Figure 9 for the list of known species in the vicinity of the project as well as information regarding the distribution of fish both up and downstream of the Bowersock Dam.

B.2.5 Shoreline and Watershed Protection Standards

Table B-7. Information Required to Support Shoreline and Watershed Protection Standards. Zones 1 and 2

Criterion	*Standard*	*Instructions*
E	1	Not Applicable / De Minimis Effect: • 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 FERC project or facility boundary). • Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.

Criterion E (Shoreline and Watershed Protection Standards) – Supporting Information:
Not Applicable/De Minimis Effect:

- There are no lands that are associated with the facility that have been deemed to be of significant ecological value. The BMPC Project is located primarily within urban parkland, riparian corridor, and cultivated fields.
- BMPC does not manage any of the lands that border any part of the BMPC Project Boundary.
- The BMPC FERC License P-13526 was issued with no requirement for Shoreline Management Plans or similar protection requirements for the facility.

B.2.6 Threatened and Endangered Species Standards

Please identify and list all federal and state listed species (fish, aquatic plants and organisms, and terrestrial plants and wildlife) in the facility area based on current data. Avoid using privileged locational information or provide that information in a separate confidential attachment or appendix.

There are no new federally listed species in the Bowersock reach of the Kansas River since 2015. See Appendix F. Note that any federal or state listed species that is included in the Douglas County list but is not included in the list below is because the habitat is not found in the Kansas River, but rather smaller tributaries in the county.

Federal Listed Species:
Federal Threatened:
Fish:
None. Federal threatened species located in Kansas are not present in the Bowersock Reach.
Mammals:
Northern Long-Eared Bat – *Myotis septentrionalis*

[4] Cross, F.B., and deNoyelles, F.J., Jr., 1982, Report on the impacts of commercial dredging on the fishery of the lower Kansas River; Kansas City, Missouri U.S. Army Corps of Engineers, DACW 41-79-C-0075 p. 268-273.

Fish:
None.
Birds:
Piping Plover – *Charadrius melodus*
Red Knot – *Calidris canutus rufa*
Invertebrates:
Rabbitsfoot Mussel – *Quadrula Cylindrica*
Plants – Terrestrial
Mead's Milkweed – *Asclepias meadii*
Western Prairie Fringed Orchid – *Plantanthera praeclara*

Federal Endangered:
Fish:
Pallid Sturgeon – *Scaphirhynchus albus*
Mammals:
Gray Bat – *Myotis grisescens*
Black-Footed Ferret – *Mustela nigripes*
Birds:
Least Tern – *Sterna antillarum*
Whooping Crane – *Grus Americana*
Eskimo Curlew – *Numenius borealis*
Invertebrates
American Burying Beetle – *Nicrophorus americanus*
Spectaclecase (mussel) – *Cumberlandia monodonta*[5]

State Listed Species:

State Threatened:
Fish With Designated Critical Habitat Present in the Kansas River in Douglas County
Flathead Chub – *Platygobio gracilis*
Plains Minnow – *Hybognathus placitus*
Shoal Chub- *Macrhybopsis hyostoma*
Sturgeon Chub- *Macrhybopsis gelida*
Fish Documented in Kansas River Without Critical Habitat in the Bowersock Reach
Western Silvery Minnow – *Hybognathus argyritis*
Mammals
Eastern Spotted Skunk – *Spilogale putorius*
Birds
Piping Plover – *Charadrius melodus*
Snowy Plover – *Charadrius alexandrinus*
Invertebrates
American Burying Beetle – *Nicrophorus americanus*

[5] "Federal Threatened and Endangered Species in Kansas." https://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/Federal-Threatened-and-Endangered-Species-in-Kansas. Date of Access 1/25/2020.; "Listed Species Believed to or Known to Occur in Kansas." https://ecos.fws.gov/ecp0/reports/species-listed-by-state-report?state=KS. Date of Access 1/25/2020.

State Endangered:

Fish With Designated Critical Habitat Present in the Kansas River in Douglas County

Silver Chub – *Macrhybopsis storeriana*

Fish Documented in Kansas River Without Critical Habitat in the Bowersock Reach

Pallid Sturgeon – *Scaphirhynchus albus*

Sicklefin Chub – *Macrhybopsis meeki*

Mammals

None

Birds

Least Tern – *Sterna antillarum*

Whooping Crane – *Grus Americana*

Eskimo Curlew - *Numenius borealis*

Invertebrates

None

Plants

None

State Species in Need of Conservation:

Fish With Critical Habitat in the Kansas River in Douglas County

None

Fish Documented in Kansas River Without Critical Habitat in the Bowersock Reach

River Shiner – *Notropis blennius*

Highfin Carpsucker – *Carpiodes velifer*

Lake Sturgeon – Acipenser fulvescens

Blue Sucker – *Cycleptus elongatus*

Johnny Darter – *Etheostoma nigrum*

Chestnut Lamprey – *Ichthyomyzon castaneus*[6]

Mammals

Southern Flying Squirrel – *Glaucomys Volans*

Franklin's Ground Squirrel – *Poliocitellus franklinii*

Birds

Black Tern – *Childonias niger*

Short-eared Owl – *Asio flammeus*

Ferruginous Hawk – *Buteo regalis*

Golden Eagle – *Aquila chrysaetos*

Bobolink – *Dolichonyx oryzivorus*

Henslow's Sparrow – *Ammodramus henslowii*

Long-billed Curlew – *Numenius americanus*

Yellow-throated Warbler – *Setophaga dominica*

Cerulean Warbler – *Setophaga Cerulean*

Eastern Whip-poor-will – *Antrostomas vociferous*

Reptiles

Timber Rattlesnake – *Crotalus horridus*

Eastern Hognose Snake – *Heterodon platirhinos*

Smooth Earth Snake – *Virginia valeriae*

Redbelly Snake – *Storeria occipitomaculata*

[6] Fish species listing confirmed via email from Jordan Hofmeier, Aquatic Ecologist, Ecological Services Section, Kanas Department of Wildlife, Parks and Tourism. 11/14/2019.

Amphibians
Crawfish Frog – *Lithobates areolate*
Invertebrates
None.
Plants
None.

Table B-8. Information Required to Support Threatened and Endangered Species Standards.

Criterion	*Standard*	*Instructions*
F	3	Recovery Planning and Action: • If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents. • Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area.

Criterion F (Threatened and Endangered Species) – Supporting Information:
Not Applicable/De Minimis Effect:

- Of the Federal and State Threatened and Endangered Species listed above, the Bowersock project is extremely unlikely to affect any of the non-aquatic species. The areas adjacent to the Project have been impacted by humans and include mostly urban development with the City of Lawrence operated parkland immediately adjacent to the river banks. The Bowersock Project has very limited impact outside the river banks.
- Of the aquatic species, there are no federally designated critical habitats in the project reach. The following state listed species do have critical habitat within the Bowersock reach. Descriptions of the fish, their habitat and life cycle are drawn from Exhibit E of the BMPC FERC License Application or are otherwise cited.

    - Flathead Chub – *Platygobio gracilis*

    The Flathead Chub is one of the larger chub species growing to 9 inches. It has a broad wedge-shaped head, large mouth, and one small barbel on each side of the mouth. Its color is light greenish or brown on the back and plain silvery on the sides. Flathead Chubs formerly occurred in the main stems of the Missouri, lower Kansas, Republican, Arkansas, and Cimarron Rivers. The only recently documented populations of this species in Kansas were found in the extreme upper reaches of the Arkansas River and in the S. Fork Nemaha River. They are known to still occur in out-of-state reaches of the Arkansas and Cimarron Rivers so may still occur in Kansas during high flow periods. The Flathead Chub occurs from the Rio Grande to the Arctic Circle in small creeks and the largest rivers that have turbid fluctuating water levels and unstable sand bottoms. As with several other plains fishes, the chub relies on flood flows to successfully spawn.

As defined by Kansas Administrative Regulations, critical habitats include those areas documented as currently supporting self-sustaining population(s) of any threatened or endangered species of wildlife as well as those areas determined by the Kansas Department of Wildlife and Parks to be essential for the conservation of any threatened or endangered species of wildlife. Currently, the following areas are designated critical for Flathead Chubs which are relevant to the BMPC Project are as follows:

"All reaches of the main stem of the Kansas River from the point it enters Douglas County at River Mile 71.3 to its confluence with the main stem Missouri River."

- Plains Minnow – *Hybognathus placitus*

The Plains Minnow is abundant in all Kansas streams that have broad beds of sand and shallow, braided flow. Within such streams, this minnow is most numerous where sediments accumulate in shallow backwaters, gentle eddies, and along the deeper edges of sand "waves" that are formed on the shifting substrate by the action of the current. They spawn from April to August. Its reproductive habits are not fully understood. Some reports indicate that it releases its eggs in strong currents to drift downstream during their development. The minnows gather in large schools to scatter their eggs in shallow backwaters. They feed along the bottom on microscopic plants (diatoms or other algae), making them partly herbivorous, and animals that occur in calm, shallow backwaters. The Plains Minnow is most commonly used for a bait fish in Kansas due to its abundance and large size.

- Shoal Chub- *Macrhybopsis hyostoma*

"The shoal chub inhabits shallow riffles of large low-gradient streams of shifting sand. It is currently found in the Republic and lower Kansas Rivers. However, it is now considered rare in the Kansas River where it was once abundant. It was previously classified as a subspecies of the speckled chub until research showed they were separate species (shoal and peppered chub). The lifespan is relatively short a sfew fish live beyond their first year. The spawning season is long (May-August) and occurs after rainfall events increase flow. The eggs develop as they drift downstream. The shoal chub is relatively small (to 2 ¾ inches), has small eyes, black specklyin on its back and a fleshy extension referred to as a barbel at the corner of its mouth… The Kansas River starting at the confluence of the Republican and Smoky Hill Rivers downstream to the confluence of the Missouri River on the Kansas-Missouri border is considered critical habitat for the shoal chub."[7]

- Sturgeon Chub- *Macrhybopsis gelida*

"The sturgeon chub has a slender nearly transparent body. Snout long, eyes small, mouth ventral with one or two prominent barbels on each side. It has a keel on each dorsal scale [and] a maximum length of 3 ½ inches. The species prefers large turbind sandy rivers over substrate of small gravel and coarse sand. They like areas swept by currents especially at heads of islands or exposed sandbars. The main stem of the Kansas River from its start at the confluence of the Republican and Smoky Hill Rivers in Geary County to its confluence

[7] https://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/All-Threatened-and-Endangered-Species/SHOAL-CHUB

with the Missouri River in Wyandotte County is considered critical habitat for the sturgeon chub."[8]

- Silver Chub – *Macrhybopsis storeriana*
  "This member of the minnow family can reach 6 inches in length. The silver chub has a blunt, rounded snout, a silvery patch in front of its large eyes, and a narrow, bright, silvery streak along the sides. There are small conical barbels at the corner of its mouth that are sensitive to taste. The silver chub is a fish of large sandy rivers. It lives on or near the bottom where it finds food by sight or taste. It is found in deep water during the summer months. Few are thought to live longer than 3 years. It was once common in the Kansas and Missouri rivers but now it is so infrequently found during sampling efforts it is considered rare. No collections from the Kansas River have been documented at the University of Kansas Museum of Natural History since 1980… Most of its natural range is east of Kansas and includes the Ohio and Mississippi river basins. In Lake Erie it is known to feed on the zebra mussel. The Kansas River from the confluence of the Republican and Smoky Hill Rivers (Ft. Riley) to the Missouri River." [9]

- The Bowersock facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, and all known government documents for the following species with Federal or State Recovery Plans.
  - Federal Recovery Plans
    - Pallid Sturgeon – *Scaphirhynchus albus*
    - Mead's Milkweed – *Asclepias meadii*
    - Western Prairie Fringed Orchid – *Platanthera praeclara*
    - Rattlesnake Master Borer Moth – *Papaipema eryngii*
    - Northern Long-Eared Bat – *Myotis septentrionalis*
  - State (Kansas) Recovery Plans
    - Sicklefin Chub, Sturgeon Chub, Western Silvery Minnow
    - Snowy Plover
  - Bowersock Impacts – Of the species listed above, Bowersock could have potential impact on the fish species including the Pallid Sturgeon, Sicklefin Chub, Sturgeon Chub, and Western Silvery Minnow.
- Federal Recovery Plan - Pallid Sturgeon
  - The US Fish and Wildlife Revised Recovery Plan for the Pallid Sturgeon references the Bowersock Dam, noting that anthropogenic alterations on the river "likely affect some aspects of Pallid Sturgeon life history. Bowersock Dam (Rkm 82, Rmi 51) near Lawrence, Kansas, was constructed in the 1870s (Figure 4). In 1952 six juvenile specimens (294-415 mm, 11.6-16.3 in) were collected below this dam during a period of record flooding (Bailey and Cross 1954). Because this barrier was installed prior to Pallid Sturgeon being

[8] https://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/All-Threatened-and-Endangered-Species/STURGEON-CHUB
[9] https://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/All-Threatened-and-Endangered-Species/SILVER-CHUB

identified as a species, there is little historical occupancy data for reaches upstream. The Johnson County Weir is another potential barrier to Pallid Sturgeon movement in the lower Kansas River (RM 23.7, RM 14.7). This structure was built in 1967 to maintain sufficient water delivery for municipal purposes. To date, 15 Pallid Sturgeon, most confirmed to be of hatchery origin (Niswonger, in litt., 2011), have been collected from the lower Kansas River. All known hatchery fish were originally stocked in the Missouri River.[10]

- The Recovery Plan recommends that agencies complete the following with regard to the Bowersock Reach:
  - Evaluate need for passage of Pallid Sturgeon at the Bowersock Dam, Kansas River.
    - Restore passage at Bowersock Dam if deemed necessary for Pallid Sturgeon recovery.[11]
- In a letter dated December 10, 2019, the US Fish and Wildlife Service wrote that "there is still the possibility that the pallid sturgeon (*Scaphirhynchus albus*) could be found directly below Bowersock Dam. Our last know records of them occurring directly below the dam was during flooding events in the 1950s. In recent times there have been nine records of pallid sturgeon below the Water One intake in Johnson County, Kanas. It is our opinion that the continued operation of Bowersock dam is not likely negatively impacting the pallid sturgeon." See Appendix F.
- Based upon a review of the US Fish and Wildlife Revised Recovery Plan for the Pallid Sturgeon, the Bowersock facility is in compliance with all relevant conditions.

- Sicklefin Chub, Sturgeon Chub, Western Silvery Minnow
  - The state of Kansas has a single recovery plan that applies to all four listed species above. Based upon a review of the plan, the Bowersock facility is in compliance with all relevant conditions.

B.2.7 Cultural and Historic Resources Standards

Please identify the cultural and historic resources present on facility-owned property or that may be affected by facility operations. Avoid using privileged locational information or provide that information in a separate confidential attachment or appendix.

[10] U.S. Fish & Wildlife Service Revised RECOVERY PLAN for the Pallid Sturgeon (Scaphirhynchus albus)https://ecos.fws.gov/docs/recovery_plan/Pallid%20Sturgeon%20Recovery%20Plan%20First%20Revision%20signed%20version%20012914_3.pdf page 19

[11] U.S. Fish & Wildlife Service Revised RECOVERY PLAN for the Pallid Sturgeon (Scaphirhynchus albus) https://ecos.fws.gov/docs/recovery_plan/Pallid%20Sturgeon%20Recovery%20Plan%20First%20Revision%20signed%20version%20012914_3.pdf page 81

Table B-9. Information Required to Support Cultural and Historic Resources Standards.

Criterion	*Standard*	*Instructions*
G	1	Not Applicable / De Minimis Effect: • 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, nor currently adversely affect any cultural or historic resources that are present on facility lands.

Criterion G (Cultural and Historic Resources) – Supporting Information:
Not Applicable/De Minimis Effect:

- There have been no cultural or historic resources documented on or in the environs of the Bowersock facility that would be affected by the operations of the facility.
- To date there is no evidence that either the facility construction or the operation of the facility have adversely affected any cultural or historic resources within the vicinity of the facility.
- See Appendix G noting no impact of construction or operations from the Kansas Historical Society.

B.2.8 Recreational Resources Standards

If applicable, please provide a copy or link to the most recent FERC Environmental Inspection Report and any follow up communications.

Table B-10. Information Required to Support Recreational Resources Standards.

Criterion	*Standard*	*Instructions*
H	2	Agency Recommendation: • Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. • Document that the facility is in compliance with all such recommendations and plans.

Criterion H (Recreational Resources) – Supporting Information:
Agency Recommendation:

- FERC License P-13526 approved a Recreation Plan for The Expanded Kansas River Hydropower Project (Bowersock).

- The facility has completed all FERC recommendations. Documentation of the completion of the plan has been submitted to FERC in consultation with FERC staff. In the course of producing the report on the completion of the Recreation Plan, it was noted that the kiosk had been installed outside the BMPC project boundary. The kiosks were placed in consultation with the City of Lawrence and since it was a good location that had been agreed upon, Bowersock was required to submit a request for a change of project boundary to FERC such that the kiosks would be incorporated into the project area. This boundary request was submitted on February 26, 2020. The Revised Recreation Plan Documentation including the requested boundary change will be submitted to FERC in conjunction with the submission of this application. All conditions regarding the BMPC Recreation Plan will be met upon the review and approval of the Recreation Filings.

B.3 Sworn Statement and Waiver Form

All applications for LIHI Certification must include the following sworn statement before they can be reviewed by LIHI:

SWORN STATEMENT

As an Authorized Representative of The Bowersock Mills & Power Co. Expanded Kansas River Hydropower Project, *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 LIHI Certification of the applying facility is granted, the LIHI Certification Mark License Agreement must be executed prior to marketing the electricity product as LIHI Certified®.

The Undersigned 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.

Company Name: The Bowersock Mills & Power Co.

Authorized Representative:

Name: Sarah H. Hill-Nelson

Title: President & CEO

Authorized Signature:

Date: 2/26/2020

Part V

B.4 Contacts Forms

All applications for LIHI Certification must include complete contact information.

A. Applicant-related contacts

Facility Owner:	
Name and Title	Sarah Hill-Nelson, President & CEO
Company	The Bowersock Mills & Power Company
Phone	785-766-0884
Email Address	shn@bowersockpower.com
Mailing Address	P.O. Box 66, Lawrence, Kansas 66044
Facility Operator (if different from Owner):	
Name and Title	N/A
Company	
Phone	
Email Address	
Mailing Address	
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	Sarah Hill-Nelson
Company	
Phone	
Email Address	
Mailing Address	
Party responsible for accounts payable:	
Name and Title	Sarah Hill-Nelson
Company	
Phone	
Email Address	
Mailing Address	

B. Current and relevant state, federal, and tribal resource agency contacts with knowledge of the facility (copy and repeat the following table as needed).

Agency Contact (Check areas of responsibility: Flows_X_, Water Quality X__, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Kansas Department of Health and Environment
Name and Title	Scott Satterthwaite, 401 Certification Officer
Phone	(785) 296-5573
Email address	Scott.Satterthwaite@ks.gov
Mailing Address	Bureau of Environmental Field Services, Watershed Management Section 1000 S.W. Jackson St., Suite 430 Topeka, KS 66612-1367
Agency Contact (Check areas of responsibility: Flows_x_, Water Quality __, Fish/Wildlife Resources __, Watersheds _x_, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Kansas Division of Water Resources
Name and Title	Katie Tietsort, Water Commissioner
Phone	785-296-5733
Email address	katie.tietsort@ks.gov
Mailing Address	Kansas Department of Agriculture Division of Water Resources Topeka Field Office 6531 S.E. Forbes Ave, Suite B Topeka, KS 66619
Agency Contact (Check areas of responsibility: Flows_X_, Water Quality __, Fish/Wildlife Resources __, Watersheds _X_, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Kansas Water Office
Name and Title	Nathan Westrup, Water Resource Planner
Phone	785-296-0689
Email address	Nathan.westrup@kwo.ks.gov
Mailing Address	900 SW Jackson Street, Suite 404 Topeka, Kansas 66612
Agency Contact (Check areas of responsibility: Flows__, Water Quality __, Fish/Wildlife Resources _X_, Watersheds __, T/E Spp. _X_, Cultural/Historic Resources __, Recreation __):	
Agency Name	US Fish and Wildlife Service
Name and Title	Jason Luginbill – Kansas Field Supervisor, Kansas Ecological Services, Mountain-Prairie Region
Phone	785-539-3474
Email address	Jason_luginbill@fws.gov
Mailing Address	2609 Anderson Avenue, Manhattan, Kansas 66502
Agency Contact (Check areas of responsibility: Flows__, Water Quality __, Fish/Wildlife Resources _X_, Watersheds __, T/E Spp. _X_, Cultural/Historic Resources __, Recreation __):	
Agency Name	Kansas Department of Wildlife, Parks and Tourism
Name and Title	Jordan Hofmeier, Aquatic Ecologist, Ecological Services
Phone	620-672-0798
Email address	Jordan.hofmeier@ks.gov

Mailing Address	512 SE 25th Ave., Pratt, KS 671124
Agency Contact (Check areas of responsibility: Flows__, Water Quality _x_, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Agency Name	Kansas Department of Health and Environment, Bureau of Water – Industrial Programs Section
Name and Title	Donald R. Carlson, PE,
Phone	785-296-5547
Email address	don.carlson@ks.gov
Mailing Address	1000 SW Jackson Street, Suite 420, Topeka, Kansas 66612-1367
Agency Contact (Check areas of responsibility: Flows__, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. _X_, Cultural/Historic Resources __, Recreation _X_):	
Agency Name	Federal Energy Regulatory Commission, Division of Hydropower Administration and Compliance
Name and Title	Mark Ivy, Senior Outdoor Recreation Planner
Phone	202-502-6156
Email address	Mark.Ivy@ferc.gov
Mailing Address	Federal Energy Regulatory Commission 888 First Street NE Washington, DC 20426
Agency Contact (Check areas of responsibility: Flows__, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources _X_, Recreation __):	
Agency Name	Kansas State Historical Society
Name and Title	Tim Weston, Historic Preservation Office - Archeologist
Phone	785-272-8681 Ext. 214
Email address	tim.weston@ks.gov
Mailing Address	6425 SW 6th Avenue, Topeka, KS 66615-1099

C. Current stakeholder contacts that are actively engaged with the facility (copy and repeat the following table as needed).

Stakeholder Contact (Check areas of interest: Flows_X_, Water Quality X_, Fish/Wildlife Resources _X_, Watersheds _X_, T/E Spp. _X_, Cultural/Historic Resources __, Recreation X_):	
Stakeholder Organization	Friends of the Kaw
Name and Title	Dawn Buehler, Executive Director, Riverkeeper
Phone	785-312-7200
Email address	riverkeeper@kansasriver.org
Mailing Address	P.O. Box 1612, Lawrence, Kansas 66044
Stakeholder Contact (Check areas of interest: Flows_X_, Water Quality _X_, Fish/Wildlife Resources _X_, Watersheds _X_, T/E Spp. __, Cultural/Historic Resources __, Recreation X__):	
Stakeholder Organization	Sierra Club – Kansas Chapter
Name and Title	C. Elaine Giesel Conservation Chair
Phone	913-206-1180
Email address	elaine.giessel@kansas.sierraclub.org
Mailing Address	11705 W. 101st Terrace Overland Park, Kansas 66214
Stakeholder Contact (Check areas of interest: Flows__, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources _X_, Recreation _X_):	
Stakeholder Organization	North Lawrence Neighborhood Association
Name and Title	Ted Boyle, President
Phone	785-842-7232
Email address	pboyle@sunflower.com
Mailing Address	310 Elm Street, Lawrence, Kansas 66044
Stakeholder Contact (Check areas of interest: Flows__, Water Quality __, Fish/Wildlife Resources __, Watersheds __, T/E Spp. __, Cultural/Historic Resources __, Recreation __):	
Stakeholder Organization	Friends of Lawrence Area Trails
Name and Title	Kate Dinneen, President
Phone	785-979-0619
Email address	katehotflash@gmail.com
Mailing Address	P.O. Box 2134, Lawrence, Kansas 66044

Appendix A – Water Quality Standards

401 Water Quality Certification
Water Quality Update Kansas Department of Health and Environment
Spill Prevention Plan Updated 2020

KANSAS
DEPARTMENT OF HEALTH
AND ENVIRONMENT

Mark Parkinson, Governor
Roderick L. Bremby, Secretary

www.kdheks.gov

April 1, 2010

Jonathan Polak, PE
Environmental Sciences
Olsson Associates
7301 West 133rd Street, Suite 200
Overland Park, KS 66213

Re: Section 401 Water Quality Certification for Federal Energy Regulatory Commission (FERC) Licensing of the Bowersock Mills Power Company Expanded Kansas River Hydropower Project, (Pre-Application Document for Preliminary Permit No. 13526. (Olsson Associates #2008-1208)

Dear Mr. Polak:

On January 29, 2010, the Kansas Department of Health and Environment (KDHE) received a request for a Section 401 Water Quality Certification (WQC) from Olsson and Associates on behalf of Bowersock and Mills Power Company for the purpose of meeting licensing requirements by FERC for proposed expansion of its operation on the Kansas River, Lawrence, KS. This 401 WQC will address the operations of the new facility on the north side of the river. The KDHE will also issue a separate 401 WQC for the Section 404 Dredge and Fill Permit for the actual construction.

Project Description: The proposed project for expansion of facilities is located on the Kansas River, on the north side of the river (Longitude -95.23556 and Latitude 38.97723), across from the existing hydroelectric power plant (BMPC South) located in the Southeast Quarter (SE ¼) of the Southwest Quarter (SW ¼) of Section 30, Township 12 South, Range 20 East in Douglas County, Kansas. The physical address for the project site is 546 Massachusetts Street, Lawrence, Kansas 66044.

Bowersock Mills Power Company is proposing to add four new turbines, operations building and other structures to the north side of the river.

Findings. Based on the information submitted by Olsson Associates and Bowersock Mills Power Company and subsequent telephone discussions with the both parties, KDEH has determined the project has the potential to discharge pollutants from the following sources:

1. Construction, grading, scraping, clearing etc.
2. Mechanical fluid spills/leaks; and
3. Operations of the new facility in concert with the existing facility.

If not minimized or otherwise controlled, discharges from these sources will cause impacts to surface waters of the state [KAR 28-16-28b]. The Kansas River is documented in the Kansas Surface Water Register [KAR 28-16-28(g)] as having designated uses of: Primary contact recreation stream segment is by law or written permission of the landowner open to and accessible by the public, domestic water, special aquatic life support (SALU), food procurement, groundwater recharge, industrial, irrigation, livestock watering supplies.

Waters designated as SALU contain designated critical habitat for threatened or endangered species, known populations of threatened or endangered species or uncommon combinations of plants and animals as documented in KAR 28-16-28d(b)(2)(A). To assure quick response to any water quality complaint occurring during the project, Bowersock Mills Power Company shall submit a project water quality protection plan (see item 6 below) to:

Kansas Department of Health and Environment
Bureau of Water- Watershed Management Section
1000 SW Jackson Street, Ste. 420, Topeka, KS
66612-1367. Attention: Scott Satterthwaite

Pursuant to Clean Water Act Section 401and KAR 28-16-28f (c), the Kansas Department of Health and Environment finds this project will not result in a violation of Kansas Water Quality Standards and hereby issues a Water Quality Certification for execution and subsequent operation of the Bowersock Mills Power Company (BMPC) expansion project, subject to the following conditions:

KDHE CONDITIONS

1. A copy of this water quality certification shall be posted on site during construction.

2. The BMPC shall implement good housekeeping practices to assure conditions do not cause the following:

   a. Surface waters of the state within and below the project area to contain discarded solid material, including trash, garbage rubbish, offal, grass clippings, discarded building or construction materials, car bodies, tires, wire and other unwanted or discarded materials [KAR 28-16-28e(b)(3)].

3. The BMPC shall avoid or control the discharge of suspended solids from construction activities and removal of riparian vegetation so that they may <u>not</u> cause:

a. Surface waters of the state within and below the project to have floating debris, scum, foam, froth and other floating materials directly or indirectly attributable to the project [KAR 28-16-28e(b)(4)].

b. Surface waters of the state within or below the project to have deposits of sludge or fine solids [KAR 28-16-28e(b)(6)].

c. Alteration of the natural appearance of surface waters of the state within or below the project by the addition of color-producing or turbidity-producing substances of artificial origin [KAR 28-16-28e(b)(8)].

d. The concentration of dissolved oxygen in the Kansas River to be lower than 5.0 mg/L.

e. Addition of suspended solids to the Kansas River in amounts and concentrations that will interfere with the behavior, reproduction, physical habitat, or other factors related to the survival and propagation of aquatic or semi aquatic life or terrestrial wildlife [KAR 28-16-28e(c)(2)(B)].

4. Construction activities disturbing one acre or more are subject to the National Pollutant Discharge Elimination System (N.P.D.E.S.) storm water permit requirements of 40 C.F.R. 122.26. The BMPC shall contact Mr. Larry Hook at 785/296-5549, lhook@kdheks.gov; Bureau of Water - Industrial Programs (BOW IP) for instructions or visit KDHE's website: www.kdheks.gov/stormwater. This permit requires a Stormwater Pollution Prevention Plan (SWP3) be prepared for implementation and be available for submittal to KDHE BOW IP.

5. The BMPC shall avoid or control the discharge of nutrients from construction activities, removal of permanent riparian vegetation, so that the project does not cause:

a. Any surface waters of the state within and below the project to have floating debris, scum, foam, froth and other floating materials directly or indirectly attributable to the project [KAR 28-16-28e(b)(4)].

b. Any surface waters of the state within and below the project to contain taste and odor producing substances at concentrations which interfere with the production of potable water by conventional water treatment processes, impart an unpalatable flavor to edible aquatic or semi-aquatic life or terrestrial wildlife or that result in noticeable odors in the vicinity [KAR 28-16-28e(b)(7)].

c. Alteration of the natural appearance of surface waters of the state within or below the project by the addition of color-producing or turbidity-producing substances of artificial origin [KAR 28-16-28e(b)(8].

d. The introduction of plant nutrients into streams, lakes, or wetlands from artificial sources shall be controlled to prevent the accelerated succession or replacement of aquatic biota or the production of undesirable quantities or kinds of aquatic life [KAR 28-16-28e(c)(2)(A)].

e. The introduction of plant nutrients into surface waters designated for primary or secondary contact recreational use shall be controlled to prevent the development of objectionable concentrations of algae or algal by-products or nuisance growths of submersed, floating, or emergent aquatic vegetation [KAR 28-16-28e(c)(7)(A)].

f. The concentration of dissolved oxygen in the Kansas River to be lower than 5.0 mg/L.

6. BMPC shall avoid or control the discharge of *Escherichia-coli* bacteria from the daily wastewater associated with manned operations and maintenance, so that the project does not cause the *Escherichia-coli* bacteria concentration of the Kansas River to exceed a geometric mean of 427 organisms per 100 milliliters during the period of Apri1 through October 31 and geometric mean of 3,843 organisms per 100 milliliters during the period of November 1 through March 31.

7. The BMPC shall avoid or control the discharge of toxic substances, oil and grease and other fluids from construction activities, so that the project does <u>not</u> cause:

a. Any surface waters of the state within and below the project area to have a public health hazard, nuisance condition or impairments of designated uses [KAR 28-16-28e(b)].

b. Any surface waters of the state within and below the project area to have toxic substances, radioactive isotopes, and infectious microorganisms in concentrations or in combinations that jeopardize the public health or the survival or well-being of livestock, domestic animals, terrestrial wildlife or aquatic or semiaquatic life [KAR 28-16 28e(b)].

c. Any surface waters of the state within and below the project area to have a visible oil and grease film or sheen on the water surface or on submerged substrate or adjoining shore lines, nor have a sludge or emulsion deposit below the water surface of adjoining shorelines [KAR 28-16-28e(b)].

d. The pH in the Kansas River to be below 6.5 or above 8.5.

e. In the Kansas River listed harmful concentrations of any substance alone or in combination with other substances causing toxic, carcinogenic, teratogenic, or mutagenic effects in humans [KAR 28-16-28e(c)(3)(C)].

f. Concentrations of substances that bio-accumulate in the tissues of edible organisms to exceed a cancer risk level of (10^{-6}) in persons consuming organisms taken from the Kansas River [KAR 28-16-28e(c)(4)(B)].

g. The concentration of dissolved oxygen in the Kansas River to be lower than 5.0 mg/L.

8. The water quality protection plan previously referenced on page 2 shall include the water quality protection measure listed below if not already addressed in the SWP3 as described in Condition 4.

a. **Riparian/Wetland Areas**: Minimize removal or disturbance of riparian/wetland areas (areas adjacent to water bodies). KDHE encourages the use of plants consistent with adjoining vegetation materials to minimize impacts from improper handling of fertilizers and pesticides.

b. **Solid Waste**: All waste materials produced by the construction project shall be disposed of in accordance with the provisions of the Kansas solid waste management statutes and regulations (K.S.A. 65-3401 and K.A.R. 28-29-1 et. seq.) or applicable local rules. Good house keeping including personal refuse such as food containers, sacks etc. shall be addressed. Good house keeping practices described above should also be incorporated into operations and management of wetlands and other structures once constructed to the extent practicable.

c. **Fuels: Chemicals and Maintenance Areas**: All fuels and chemicals necessary to complete the project shall be stored in such a manner that accidental spillage is minimized or can be temporarily contained before reaching the water body. Equipment maintenance areas shall also be located in this manner.

d. The applicant has stated the bathrooms will be equipped with composting toilets whose solids will be disposed of compliant with county codes. All other wastewater (grey water, including floor drains) will be deposited into a self contained receptacle and regularly pumped for proper disposal. This is consistent with the requirement to comply with KAR 28-5-1 through 9, Bulletin 4-2 and county codes; and meet local ordinances. The BMPC shall contact the Lawrence-Douglas County Health Department to assure

compliance with local codes and ordinances: Mr. Richard Ziesenis, (785) 843-3060, rziesenis@ldchd.lawrence.ks.us.

e. **All stormwater** shall be managed in a manner consistent with local ordinances administered through the City of Lawrence.

f. **Alternatives** to solvents and cleaners should be considered to prevent accidental spills directly to the Kansas River**.**

g. **Materials** used for bank stabilization or armoring shall be free of pollutants likely to wash off into the Kansas River.

h. **Spills:** Should a spill of fuel or discharge of pollutants occur, the local emergency staff should be contacted first by dialing 911. The Kansas Department of Health and Environment shall then be notified immediately: (785) 296-1679 (24 hours a day.) These incidences should also be reported to the National Spill Response Center (1-800*424-8802). Hazardous materials spills and air releases that meet federal reportable quantities must also be reported to Kansas Division of Emergency Management (800-275-0297)."* These reporting numbers shall be posted in several locations around the site. A Spill Prevention and Response Plan should be prepared. This should include reportable quantity limits (see www.kansas.gov/kdem).

9. This certification does not relieve the BMPC of the responsibility for any discharge into waters of the state. The Kansas Department of Health and Environment retains the option of revoking or revising this certification any time an inappropriate discharge may occur. As provided by K.S.A. 65-171(f), failure to comply with the conditions of this certification may subject the responsible party to fines up to $10,000 per violation with each day the violation occurs constituting a separate violation.

10. If the BMPC believes the conditions of this certification will result in impairment of important social and economic development, the BMPC is advised of the variance provisions of KAR 28-16-28b(jjj) and KAR 28-16-28f(e).

Finally, the location of this activity involving the Kansas River is located within the Lower Kansas River Watershed Restoration and Protection Strategy project area. The Stakeholder Leadership Team has received several certified letters which they have noted. Please keep them informed of your progress by communicating with Mr. Rick Davis at: 785/233-5632, or by emailing to: rdavis@kaws.org.

Questions concerning this certification may be directed to Mr. Scott Satterthwaite, 785-296-5573 or by email at: ssattert@kdhe.state.ks.us.

Sincerely,

Scott L. Satterthwaite

Scott L. Satterthwaite, M.S.
Non-point Source Pollution Control Specialist
Bureau of Water-Watershed Management Section

EC: KDHE-Hook, Reed, Carlson
KDHE NEDO- Rowlands
KDA-DWR, Matt Scherer
EPA- Catherine Holsten
USF&WS- Susan Blackford
KDWP- James Larson
US ACE- Kayle Horton
Rick Davis- KAWS
Richard Ziesenis- Lawrence-Douglas County Health Department
Sarah-Hill Nelson- Bowersock Mills Power CompanyMPC

Division of Environment
Curtis State Office Building
1000 SW Jackson St., Suite 400
Topeka, KS 66612-1367

Kansas
Department of Health and Environment

Phone: 785-296-1535
Fax: 785-559-4264
www.kdheks.gov

Lee A. Norman, M.D., Secretary

Laura Kelly, Governor

December 3, 2019

Ms. Sarah Hill – Nelson
The Bowersock Mills and Power Company
P.O. Box 66
500 South Powerhouse Road
Lawrence, Kansas 66044

Dear Ms. Hill-Nelson:

This letter conveys the belief from the Bureau of Water at the Kansas Department of Health and Environment that the Expanded Kansas River Hydropower Project at Bowersock does not introduce pollutants that cause or contribute to the impairments of the Kansas River as noted in Kansas' 2018 Section 303d list of water quality limited reaches. The chief pollutants of total suspended solids, total phosphorus and E. coli bacteria impairing the stretch of the Kansas River from Lawrence to Eudora are not associated with the operations at Bowersock.

There is a current impairment for Biology throughout the length of the Kansas River, including near Lawrence. Biology impairments are complicated by the multiple stressors that impact the biota of the river, including discharge of pollutants, alterations in flow and destruction of habitat. It is our belief that the Bowersock project, given its flow-through nature and long-standing presence on the river, does not impair the river. Ironically, the presence of the mill dam may act as a physical barrier to the migration of Asian Carp coming up from the confluence of the Kansas and Missouri rivers, thereby protecting the upper portions of the Kansas River from the impacts of this invasive species.

In summary, the operations of the Bowersock project should retain its status as a "Low Impact" hydropower project.

Sincerely,

Thomas C. Stiles
Director, Bureau of Water
Kansas Department of Health and Environment

The Bowersock Mills & Power Co. Water Quality Protection/ Spill Prevention and Response Plan

Revised 2/20/2020

The Bowersock Mills & Power Co. (BMPC) was granted a Section 401 Water Quality Certification (WQC) on April 1, 2010. The 401 WQC was granted as a part of the licensing requirements by the Federal Energy Regulatory Commission (FERC) for the proposed expansion of the Bowersock operation on the Kansas River, Lawrence, Kansas. The Kansas Department of Health and Environment (KDHE) issued a separate 401 WQC for the operations of the new facility on the north side of the river.

BMPC has revised the required Spill Prevention and Response Plan which addresses operations in both the North and the South Powerhouses. As a part of the 401 WQC, KDHE established the following conditions that remain relevant following project construction. The numbers in parentheses reflect the original condition number.

1. (2.) The BMPC shall implement good housekeeping practices to assure conditions do not *cause* the following:
    a. Surface waters of the state within and below the project area to contain discarded solid material, including trash, garbage rubbish, offal, grass clippings, discarded building or construction materials, car bodies, tires, wire and other unwanted or discarded materials [KAR 28-16-28e(b)(3)].
2. (6.) BMPC shall avoid or control the discharge of *Escherchia-coli* bacteria from the daily wastewater associated with manned operations and maintenance, so that the project does not cause the *Escherchia-coli* bacteria concentration of the Kansas River to exceed a geometric mean of 427 organisms per 100 milliliters during the period of April 1 through October 31 and geometric mean of 3,843 organisms per 100 milliliters during the period of November 1 through March 31.

The following items in the 401 WQC permit were listed as required to address “any water quality complaint during the project.” BMPC is including the following items in this Water Quality Protection/Spill Prevention and Response Plan as part of internal project standard operating procedures as we have determined that they are commonsense efforts to protect water quality.

3. (7.) The BMPC shall avoid or control the discharge of toxic substances, oil and grease and other fluids from construction activities, so that the project does <u>not</u> cause:
    a. Any surface waters of the state within and below the project area to have a public health hazard, nuisance condition or impairments of designated uses [KAR 28-16-28e(b)].
    b. Any surface waters of the state within and below the project area to have toxic substances, radioactive isotopes, and infectious microorganisms in concentrations or in combinations that jeopardize the public health or the survival or well-being of livestock, domestic animals, terrestrial wildlife or aquatic or semiaquatic life [KAR 28-16-28e(b)].

   c. Any surface waters of the state within and below the project area to have a visible oil and grease film or sheen on the water surface or on submerged substrate or adjoining shore lines, nor have a sludge or emulsion deposit below the water surface of adjoining shorelines [KAR 28-16-28e(b)].
   d. The pH in the Kansas River to be below 6.5 or above 8.5.
   e. In the Kansas River listed harmful concentrations of any substance alone or in combination with other substances causing toxic, carcinogenic, teratogenic, or mutagenic effects in humans [KAR 28-16-28(c)(4)(B)].
   f. The concentration of dissolved oxygen in the Kansas River to be lower than 5.0 mg/L.

4. (8e.) All stormwater shall be managed in a manner consistent with local ordinances administered through the City of Lawrence.
5. (8f.) Alternatives to solvents and cleaners should be considered to prevent accidental spills in the vicinity of the Kansas River.
6. (8h.) Spills: Should a spill of fuel or discharge of pollutants occur the local emergency staff should be contacted first by dialing 911. The Kansas Department of Health and Environment shall then be notified immediately: (785) 296-1679 (24 hours a day.) These incidences should also be reported to the National Spill Response Center (800-424-8802). Hazardous materials spills and air releases that meet federal reportable quantities must also be reported to the Kansas Division of Emergency Management (800-275-0298). These reporting numbers shall be posted in several locations around the site. A Spill Prevention and Response Plan should be prepared. This should include reportable quantity limits (http://www.kdheks.gov/spill/).
7. (9) This certification does not relieve the BMPC of the responsibility for any discharge into waters of the state. The Kansas Department of Health and Environment retains the option of revoking or revising this certification at any time an inappropriate discharge may occur. As provided by K.S.A. 65-171(f), failure to comply with the conditions of this certification may subject the responsible party to fines up to $10,000 per violation with each day the violation occurs constituting a separate violation.
8. (10) If the BMPC believes the conditions of this certification will result in impairment of important social and economic development, the BMPC is advised of the variance provisions of KAR 28-16-28b(jjj) and KAR 28-16-28f(e).

North Plant Spill Prevention

The North Plant/Powerhouse has seven pieces of equipment that use oil, and surplus oil is stored in the North Powerhouse in 55 gallon drums. The following section describes each piece of equipment that contains oil, the quantity of oil in the equipment, the potential for discharge, and the methods used to prevent discharge from the referenced equipment.

#8 Generator

The #8 Generator has two oil reservoirs. The upper generator reservoir is used to lubricate and cool the upper guide assembly and the thrust bearing. This reservoir operates with a mix of Chevron GST 68 and Chevron Rando 32. Blended together they create ISO 46. In the upper generator bearing assembly, the oil is contained in the assembly reservoir as well as an ancillary tank. The upper generator assembly has the capacity to hold 75 gallons of oil. The oil is circulated outside the unit through a heat exchanger that is supplied with City water. The potential for discharge of oil from the #8 Generator is low, but possible. An event of discharge would be related to a leak in the oil reservoir or the piping that transports the oil

through the reservoir. The tank is elevated at the generator level, and the inlet and outlet pipes are located at the midpoint of the tank. Due to the location of the inlet and outlet points, in the event of a piping leak, approximately half of the total reservoir could leak out, for a total of 37 gallons. In the extremely unlikely event of a leak in the bottom of the oil reservoir, a total of 75 gallons is at risk for leakage.

The lower generator guide bearing reservoir is used to lubricate and cool the lower generator guide bearing. This reservoir holds approximately 5 gallons of oil and operates with Chevron Rando 32. The oil in the lower bearing is pumped from the reservoir below the bearing to the top of the bearing through a mechanical pump located inside of the reservoir. There is a small quantity of oil that stays in the reservoir which has a very limited potential for cracks or leaks as it is made of a single piece of steel with no penetrations.

#8 Spill Prevention – The #8 Unit is visually inspected daily for any leaks. Additionally, the #8 Unit is monitored for temperature. A leak of any significance would cause the unit temperature to rise which sets off an alarm and shuts the unit down. Should a spill occur, the oil would drop on to the midbay, where it would land on the midbay bearing and pool on the midbay. It is possible that some of the oil could leak into the river but the leak would be limited and primarily contained on the midbay floor.

#9 Generator

The #9 Generator has two oil reservoirs filled with Chevron GST ISO 68 that are used to cool and lubricate bearings.

The upper oil reservoir has a capacity of 150 gallons. This reservoir has copper cooling coils submerged in the oil. Water is pumped out of the river and through the coils to cool the oil. The risk of oil discharge is low, but possible. In the extremely unlikely event of a leak in the bottom of the oil reservoir, a total of 150 gallons is at risk for leakage.

The lower oil reservoir has a capacity of 35 gallons. This reservoir has copper cooling coils submerged in the oil. Water is pumped out of the river and through the coils to cool the oil. The risk of oil discharge is low, but possible. In the extremely unlikely event of a leak in the bottom of the oil reservoir, a total of 35 gallons is at risk for leakage.

#9 Spill Prevention – The #9 Unit is visually inspected daily for any leaks. Additionally, the system is monitored for cooling water pressure and temperature. A leak would cause a change in both the cooling water pressure and the unit temperature which sets off an alarm and shuts down the unit. Should a spill occur, the oil would drop on to the midbay, where it would land on the midbay bearing and pool on the midbay. It is possible that some of the oil could leak into the river but the leak would be limited and primarily contained on the midbay floor.

#10 Generator

The #10 Generator has two oil reservoirs filled with Chevron GST ISO 68 that are used to cool and lubricate bearings.

The upper oil reservoir has a capacity of 150 gallons. This reservoir has copper cooling coils submerged in the oil. Water is pumped out of the river and through the coils to cool the oil. The risk of oil discharge

is low, but possible. In the extremely unlikely event of a leak in the bottom of the oil reservoir, a total of 150 gallons is at risk for leakage.

The lower oil reservoir has a capacity of 35 gallons. This reservoir has copper cooling coils submerged in the oil. Water is pumped out of the river and through the coils to cool the oil. The risk of oil discharge is low, but possible. In the extremely unlikely event of a leak in the bottom of the oil reservoir, a total of 35 gallons is at risk for leakage.

#10 Spill Prevention – The #10 Unit is visually inspected daily for any leaks. Additionally, the system is monitored for cooling water pressure and temperature. A leak would cause a change in the cooling water pressure and unit temperature which sets off an alarm and shuts down the unit. Should a spill occur, the oil would drop on to the midbay, where it would land on the midbay bearing and pool on the midbay. It is possible that some of the oil could leak into the river but the leak would be limited and primarily contained on the midbay floor.

#11 Generator

The #11 Generator has two oil reservoirs. The upper generator reservoir is used to lubricate and cool the upper guide assembly and the thrust bearing. This reservoir operates with a mix of Chevron GST 68 and Chevron Rando 32. Blended together they create ISO 46. In the upper generator bearing assembly, the oil is contained in the assembly reservoir as well as an ancillary tank. The upper generator assembly has the capacity to hold 75 gallons of oil. The oil is circulated outside the unit through a heat exchanger that is supplied with City water. The potential for discharge of oil from the #11 Generator is low, but possible. An event of discharge would be related to a leak in the oil reservoir or the piping that transports the oil through the reservoir. The tank is elevated at the generator level, and the inlet and outlet pipes are located at the midpoint of the tank. Due to the location of the inlet and outlet points, in the event of a piping leak, approximately half of the total reservoir could leak out, for a total of 35 gallons. In the extremely unlikely event of a leak in the bottom of the oil reservoir, a total of 75 gallons is at risk for leakage.

The lower generator guide bearing reservoir is used to lubricate and cool the lower generator guide bearing. This reservoir holds approximately 5 gallons of oil and operates with Chevron Rando 32. The oil in the lower bearing is pumped from the reservoir below the bearing to the top of the bearing through a mechanical pump located inside of the reservoir. There is a small quantity of oil that stays in the reservoir which has a very limited potential for cracks or leaks as it is made of a single piece of steel with no penetrations.

#11 Spill Prevention – The #11 Unit is visually inspected daily for any leaks. Additionally, the #11 Unit is monitored for temperature. A leak of any significance would cause the unit temperature to rise which sets off an alarm and shuts the unit down. Should a spill occur, the oil would drop on to the midbay, where it would land on the midbay bearing and pool on the midbay. It is possible that some of the oil could leak into the river but the leak would be limited and primarily contained on the midbay floor.

Gate Positioner System (2 Skids)

The North Powerhouse Gate Positioner system is hydraulically operated and uses AW 46 Hydraulic oil. The hydraulic pressure in the system is used to open and close wicket gates in the turbines. The North Powerhouse units operate with two separate gate positioner skids. Units #8 and #9 operate off of one hydraulic skid and Units #10 and #11 operate off a second skid. The skids are identical, each one

containing two hydraulic cylinders, one for each unit. Each hydraulic cylinder contains 5 gallons of oil, with a single oil reservoir that contains 60 gallons of oil. This system also uses a twin tank pressure accumulator with an oil capacity of 10 gallons for a total of 80 gallons of oil per skid.

Gate Positioner Spill Prevention – The North Powerhouse Gate Positioner System is inspected daily for leaks. Both gate positioner skids have an integrated oil containment system designed to hold the total spill potential of the skid.

Trash Rake

Racks at the North Powerhouse are cleaned with a hydraulically operated Alpine Machine Trash Rake. The trash rake is located on the forebay deck of the North Powerhouse.

Trash Rake Oil

The oil used in the Trash Rake is Bioblend BioFlo HEES 68. Bioblend HEES 68 meets the US EAP requirements to be classified as an Environmentally Acceptable Lubricant (EAL) as per the definition used in the 2013 Vessel General Permit for the marine industry. To be classified as an EAL, the product must be ultimately biodegradable, have low toxicity, and be non-bioaccumulative. BioFlo HEES has been deemed "readily biodegradable" and "minimally toxic" to algae, daphnia, and fish. Bioflo HEES was developed for use in "any industry utilizing mobile or stationary hydraulically powered equipment, especially hydraulic systems where a release into the environment is possible or where a leak or spill could reach a waste stream."

There is one oil reservoir in the trash rake that has a 60 gallon capacity. BMPC maintains the 30-40 gallons of oil in this reservoir for normal trash rake operations. The potential for leakage from the trash rake is through the hoses that supply oil to the moving parts of the machine, in particular the wheel motors.

Trash Rake Spill Prevention

Although the oil used in the trash rake is readily biodegradable and not bioaccumulative, BMPC makes every effort to prevent any oil leaking into the Kansas River.

The trash rake is inspected daily for any leaks. Any leaks detected are addressed immediately. Any Bioflo that leaks to the forebay deck is absorbed with soaked up with absorbent material. A dry spill kit is stored at the North Powerhouse to address any leaks.

North Powerhouse Stored Oil

There is always some oil stored at the North Powerhouse, although Bowersock works to limit the number of barrels stored at this location. The oil stored at the North Powerhouse in any significant quantities includes Chevron GST ISO 63, Chevron Rando ISO 32, and Bioblend BioFlo HEES 68.

Stored Oil Spill Prevention

The oil storage barrels in the North Powerhouse are visible and any leak would be detected on the daily walk through. If oil spills on the generator floor of the North Powerhouse, this spill is addressed by using the dry spill kit located at the North Powerhouse. Any residue oil not captured via the dry spill kit will drain to the floor drain system which directs all water and oil to the City of Lawrence sewer system.

South Plant Spill Prevention

The South Plant (South Powerhouse and Warehouse) has nine pieces of equipment that use oil, and surplus oil is stored in the South Warehouse in barrels. The following section describes each piece of equipment that contains oil, the quantity of oil in the equipment, the potential for discharge, and the methods used to prevent discharge from the referenced equipment.

Seven Generators

The generators in the South Powerhouse are cooled and lubricated with oil. There are three different generator types, but all have similar oil storage capacities.

Unit #1

This unit uses Chevron GST ISO 68. The unit has two upper oil reservoirs and one lower reservoir. The highest reservoir has a capacity of 3 gallons, the second upper reservoir has a capacity of 3 gallons, and the lower reservoir has a capacity of 4 gallons. The total oil capacity for unit #1 is 10 gallons.
The possibility for a leak is extremely low as the oil does not leave the cast iron pans and the reservoirs do not have cooling water running through them. In the event of a leak, the oil would be contained to the midbay with a limited amount spilling into the river.

Units #2 - #5

These units use Chevron GST ISO 68 in all reservoirs. Each unit has an oil capacity of 12 gallons. These units have two reservoirs. The upper reservoir is an oil bath that cools the upper guide and thrust bearing. The upper reservoir has a capacity of 6 gallons. The risk of a leak is extremely low as the oil is contained in a cast iron housing. The lower guide assembly has a sump pan directly underneath the bearing. There is a mechanical pump located inside the oil sump pan that pumps oil to the top of the bearing for lubrication and cooling. The lower reservoir has a capacity of 4 gallons. The risk of a leak is low, but it is possible. In the event of a leak, the oil would be contained to the midbay with a limited amount spilling into the river.

Units #6 & #7

These units use Chevron GST ISO 68 in all reservoirs. Each unit has an oil capacity of 12 gallons. These units have two reservoirs. The upper reservoir is an oil bath that cools the upper guide and thrust bearing. The upper reservoir is cooled by copper coils submerged in the oil. Glycol is pumped through them to cool the oil. The upper reservoir has a capacity of 8 gallons. The risk of a leak is extremely low as the oil is contained in a cast iron housing. The lower guide has a sump pan directly underneath the bearing. There is a mechanical pump located inside the oil sump pan that pumps oil to the top of the bearing for lubrication and cooling. The lower reservoir has a capacity of 4 gallons. The risk of a leak is low, but it is possible. In the event of a leak the oil would be contained to the midbay with a limited amount spilling into the river.

South Powerhouse Generator Spill Prevention

The South Powerhouse Generators are visually inspected daily for any leaks. In the event of an oil leak from one of the units, the oil would be contained on the midbay with a limited amount spilling into the river. Oil spill cleanup materials are stored in readily available locations at the South Powerhouse.

South Powerhouse Gate Positioner System

The gate positioner system at the South Powerhouse is hydraulically operated. The hydraulic pressure in the system is used to open and close wicket gates in the turbines. This system consists of one main reservoir, an electric pump, and three accumulator tanks. The South Powerhouse Gate Positioner Pressure System is located on the north wall of the South Powerhouse between units #3 and #4. The oil reservoir for the system has the capacity to store approximately 85 gallons of oil, with the potential to spill approximately 50. Six of the seven units at the South Powerhouse operate with a Woodward Governor. The exception to this is the #4 unit which is electrically operated. Each Woodward Governor operates via the shared hydraulic pressure in the combined system. The hydraulic pressure is supplied to each governor via galvanized pipes that are routed under the powerhouse floor. The oil lines have a low risk of leakage. Any spilled oil would be contained to the midbay floor with a limited amount spilling into the river.

South Powerhouse Gate Positioner Spill Prevention

Each Woodward Governor is located next to the generator it regulates. An oil spill from a Woodward Governor would be contained on the generator floor though the placement of a tube of oil absorbent which is placed at the opening to the generator. This is the only location in the vicinity of the governor which would allow the oil to leave the generator floor. The primary reservoir for the South Powerhouse Gate Positioner System has an overflow reservoir. This overflow reservoir has the potential to hold 55 gallons and is located on the midbay. The oil reservoir is surrounded by a spill berm which is attached to the midbay floor.

South Warehouse Stored Oil

Oil at the South Plant is stored on the east wall of the warehouse. All oil is stored on an oil catchment pallet. This pallet has a built-in reservoir designed to catch any spills. The capacity of this reservoir is 75 gallons. In the event of the pallet catchment system overflowing, the oil would be contained to the warehouse floor. BMPC regularly schedules oil disposal in order to limit the amount of oil which is at risk for leakage.

Reporting

Reportable Quantity Limits

The State of Kansas requires action for the following:
"All sewage, substances, materials, or wastes, as set forth in 65-17d, regardless of phase or physical state, which are, or threaten to contaminate or alter any of the properties of the waters of the state or pollute the soil in a detrimental, harmful, or injurious manner or create a nuisance, shall be reported." (KAR 28-48 – Spill Reporting). The state refers to the Environmental Protection Agency with regard to quantities, requiring reporting for spills that impact the soil or waters of the state.

The EPA Oil Discharge Reporting Requirements regarding quantities are as follows:
"A harmful quantity is any quantity of discharged oil that violates state water quality standards, causes a film or sheen on the water's surface, or leaves a sludge or emulsion beneath the surface. For this reason, the Discharge of Oil regulation is commonly known as the "sheen" rule. Note that a floating sheen alone is not the only quantity that triggers the reporting requirements (e.g., sludge or emulsion deposited below the surface of the water may also be reportable).

Under this regulation, reporting oil discharges does not depend on the specific amount of oil discharged, but instead can be triggered by the presence of a visible sheen created by the discharged oil or the other criteria described above."

Spill Prevention, Control, and Countermeasure (SPCC) Rule
BMPC has reviewed the EPA Guidelines regarding the SPCC Rule. Based on the limited amount of oil that is stored at the Bowersock Facility, Bowersock has concluded that the facility is not subject to the SPCC rule. As a result, Bowersock has determined that the applicable measure of "harmful quantity" of oil is dictated by the "sheen" rule as described above.

BMPC Potential for Reporting

The potential for BMPC to need to report is low, due to the use of biodegradable oils in the trash rake as well as the limited quantity of oil in the trash rake and limited oil storage through the remainder of the facility and equipment. In the event of a spill that meets the "sheen test" as described above, the protocol is to contact the agencies listed below.

Contact Information:

Kansas Spill Reporting Number:	785-291-3333
National Response Center:	800-424-8802
EPA Region 7:	913-281-0991
KDHE Fish Kill:	785-296-1679

Appendix B – Key Electronic Records

Hyperlinks to key electronic records on FERC e-Library Website

FERC License
August 19, 2010
Order Issuing Original License and Terminating Exemption from License
https://elibrary.ferc.gov/veritydocs/12416328.pdf#xml=http://elibrary.ferc.gov/IDMWS/search/xmlview.asp?dockey=13840840@09_10_11&Query=License&DynamicURL=http://elibrary.ferc.gov/veritydocs/12416328.pdf

Recreation-Related Documents
February 9, 2018
Order Approving Recreation Plan
https://elibrary.ferc.gov/veritydocs/14819175.pdf#xml=http://elibrary.ferc.gov/IDMWS/search/xmlview.asp?dockey=14641971@18_19_20&Query=Recreation&DynamicURL=http://elibrary.ferc.gov/veritydocs/14819175.pdf

June 19, 2017
Final Recreation Plan
https://elibrary.ferc.gov/veritydocs/14617669.pdf#xml=http://elibrary.ferc.gov/IDMWS/search/xmlview.asp?dockey=14581056@15_16_17&Query=Recreation&DynamicURL=http://elibrary.ferc.gov/veritydocs/14617669.pdf

Environmental and Public Use Inspection Documents
2009 Environmental Inspection Report
https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=12199168

Appendix C – Unit Specifications

Facility Description Information
Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit

BMPC South Powerhouse
BMPC South Powerhouse generating equipment has not changed since the initial LIHI Certification. A summary of key information on the existing turbines and generators in operation is as follows:

Unit #1:

Leffel 56 F type turbine – 1962 (runner date)
Hydraulic Capacity - Minimum: 0 CFS, Maximum: 285 CFS
Electrical Machinery Company A/C Type Generator
Rated Capacity: 350 kW
Age: 1918
Stator Rewind: 1992
Rotor Rewind: 1999

Unit #2:

Leffel 39 Z type turbine – 1997 (runner date)
Hydraulic Capacity - Minimum: 0 CFS, Maximum: 325 CFS
General Electric A/C TRC type generator
Rated Capacity: 300 kW post 1977 Rewind
Age: 1925
Stator Rewind: 1977
Rotor Rewind: 1977

Unit #3:

Leffel 39 Z type turbine – 2002 (runner date)
Hydraulic Capacity - Minimum: 0 CFS, Maximum: 325 CFS
General Electric A/C TRC type generator
Rated Capacity: 350 kW as per SW Electric
Age: 1925
Stator Rewind: 2007
Rotor Rewind: 2007

Unit #4:

Leffel 39 Z type turbine – 1999 (runner date)
Hydraulic Capacity - Minimum: 0 CFS, Maximum: 325 CFS
General Electric A/C TRC type generator
Rated Capacity: 310 kW; Uprated 1985 Rewind
Age: 1925
Stator Rewind:1985
Rotor Rewind: 1999

Unit #5:

Leffel 39 Z type turbine – 1997(runner date)
Hydraulic Capacity - Minimum: 0 CFS, Maximum: 325 CFS

General Electric A/C TRC type generator
Rated Capacity: 340 kW
Age: 1922
Stator Rewind: 1998
Rotor Rewind: 1993

Unit #6:

Leffel 39 A type turbine – 1966 (runner date)
Hydraulic Capacity - Minimum: 0 CFS, Maximum: 285 CFS
General Electric A/C ATB type generator
Rated Capacity: 350 kW
Age: 1925
Stator Rewind: 1998
Rotor Rewind: 1978

Unit #7:

Leffel 39 A type turbine – 1965 (runner date)
Hydraulic Capacity - Minimum: 0 CFS, Maximum: 285 CFS
General Electric A/C ATB type generator
Rated Capacity: 350 kW
Age: 1925
Stator Rewind: 2019
Rotor Rewind: 2001

All units with the exception of Unit #4 operate with Woodward Governors. The #4 Governor is an electronic gate positioner and was designed through a collaborative project with the University of Kansas Mechanical Engineering Department and upgraded in July 2018 by Bat Electric.

BMPC North Powerhouse

Number, type, and size of turbines, including maximum and minimum hydraulic capacity of each unit

Unit #8:

Leffel 57-A type turbine/hybrid runner – 1965 (runner date)
Fixed Blade Propeller Runner
Hydraulic Capacity - Minimum: 0 CFS, Maximum: 1,000 CFS
General Electric 1,200 kW – Turbine Limited to 1,000 kW
Age: 1925
Stator Rewind: 2012
Rotor Rewind: 2012

Unit #9:

Harbin Electric Corporation
Turbine Type - ZDK708-LM-250 – Fixed Blade Propeller Runner
1,600 KW
Design Head 6.4 m
Design Flow 28.3 cubic meters per second
Rated Speed 163.6 rpm
Runaway Speed 272 rpm
Product No. S2012-12

Generator Type – SF1500-44/2860
KVA 1666.7
V 4160
A 231.3
Power Factor .9
Rated Frequency Hz
Excitation Voltage 147
Excitation Current 242
3-Phase
Insulation Class F/F
Connection Y
Thrustload 38 KN
Stator/Rotor: OEM 2012

Unit #10:

Harbin Electric Corporation
Turbine Type - ZDK708-LM-250 – Fixed Blade Propeller Runner
1,600 KW
Design Head 6.4 m
Design Flow 28.3 cubic meters per second
Rated Speed 163.6 rpm
Runaway Speed 272 rpm
Product No. S2012-12
Generator Type – SF1500-44/2860
KVA 1666.7
V 4160
A 231.3
Power Factor .9
Rated Frequency Hz
Excitation Voltage 147
Excitation Current 242
3-Phase
Insulation Class F/F
Connection Y
Thrustload 38 KN
Stator/Rotor: OEM 2012

Unit #11:

Leffel 57-A type turbine/hybrid runner – 1965 (runner date)
Fixed Blade Propeller Runner
Hydraulic Capacity - Minimum: 0 CFS, Maximum: 1,000 CFS
General Electric Rated Capacity 1,200 KW – Turbine Limited to 1,000 kW
Age: 1925
Stator Rewind: 2012
Rotor Rewind: 2012

BMPC Expanded Kansas River Hydroelectric Power Project Turbine.Generator Stats

	Turbine Type & Manufacturer	Nameplate Date	Runner Date & Manufacturer	Turbine Maintenance	Generator Manufacturer	Serial Number	kW/Amperes/Poles	Stator	Rotor	Shaft Maintenance	Bearings	Draft Tube	Wicket Gates
Unit #1	Leffel O. no. W-2084;56F	1938 (Replaced S. Morgan Smith)	Leffel O. no. W2084; 1962	1978 Rebuild - Leffel; 12 Gate Links; 2 bronze bushings; 12 Eccentric Gate Pins	Electric Machinery Company	353866	350 kW/301/66	2017 Stator Stacking Reinsulation; 2013 PdMA Test; 2013 Cryoclean; 1992 Rewind - Hancock Electric	2002 1 Pole Repair; 1999 Rewind All 66 Poles - Independent Electric	1999	2017 Thrust Collar Rehab. sleeve collar & turn & true shaft	Concrete	Unknown. Spare Set in House
Unit #2	Leffel O. no. W-2703; 39Z	1951 (Replaced 1922 39Z)	2006 Runner Maintenance - Union Machine; 1997 Runner Thos. Bros.	2018 Gate Casing Maintenance; 2008 Rebuild	General Electric	2540530 ENE 10357	300/78.3/60	1977 Rewind - GE, Class F Insulation. Class F worth 15 % upgrade from 315kVA as per GE Bart	1977 Rewind - GE, Class F Insulation	2016 Shaft Sleeve welded; 2008 Lower Stub Shaft fabricated Union Machine; 1985 Intercontinental Shaft	2002 Guide Bearing Rebabbitt - Union Machine	2005 Replaced	2004 Thomas Bros.
Unit #3	Leffel O. no. W-2502; 39Z	1946 (Replaced 1922 39Z)	2000 - Thos. Bros 1946 - Leffel	2009 Maintenance - Link & Pin Replacement	General Electric	2540532 ENE 10357	350/78.3/60	2007 Rewind - Southwest Electric ; 2015 Replacement Slip Rings	2007 Rewind Southwest Electric	2015 - True & Sleeve Shaft	2015 Upper Generator Guide Rebabbitt - AMS Bearing 2015 - Cutless Bearing 1983 - Thrust Bearing		
Unit #4	Leffel O. no. W-2644; 39Z	1949 (Replaced 1922 39Z)	1999 - Thos. Bros. 1949 - Leffel	2008 stay vanes pins & links replaced	General Electric	2540520 ENE 10357	310/78.3/60	1985 Rewind - Southwest Electric Uprate to 310 kW	1999 Rewind - Southwest Electric	1999 - Lower Shaft Replaced 1985 - New Intercont.	2018 Governor Upgrade - Bat Electric; 1986 - Thrust Bearing Rehab - GE; Plate, Collar, Springs - Union; Lower Guide - rey/mac		2008 New Set of Gates; Machined by Union
Unit #5	Leffel O. no. W-2742; 39Z	1951 (Replaced 1940 56F which had replaced 1922 39Z)	1997 - Thos. Bros. 1922 - Leffel		General Electric	2540531 ENE 10357	340 kW/78.3/60	1998 Rewind - Southwest Electric; 1987 GE Rewound & Uprate to 340 kW	1993 60 Pole Pieces Rewound; 1987 - GE Rewind	2017 Shaft trued and chromed Hausner Hard Chrome	2017 Midbay Rebabbitt - BBR; 2015 Roller Bearing, Thrust Collar, & Upper Gen Guide Rehab/Rebabbitt - Riverside; 1979 Turbine Rebuild - Tedrow		2009 Re-Bush Wicket Gates
Unit #6	Leffel O. no. W-2310; 39A	1943 (Replaced 1925 39B)	1925 - Leffel		General Electric	4097719	350/94/32	1998 Rewind - Southwest Electric; 1978 Rewind - GE	1978 Rewind - GE		2000 Guide - Union; 1979 Turbine Rebuild - Tedrow	2009 BMPC	
Unit #7	Leffel O. no. W-2310; 39A	1943 (Replaced 1925 39B)	1943 - Leffel 1925 - Leffel	2016 Rebuild; Stationary & Rotatational Alignment	General Electric	4097720	350/94/32	2019 Rewind - Independent Electric	2001 Rewind - Wilson Electric	2017 trued, sleeved & chromed	2019 - Thrust Plate Refinish; 2016 - Thrust, Midbay, TGB; 2016 Rebuild noted.	2010 BMPC	
Unit #8	Leffel 57-A	1925	1969 Leffel Hybrid A	2012 Refurbished Installation	General Electric	4098028	1000 kW w. Leffel A Runner	2012 Rewind - Cole Electric	2012 Rewind - Cole Electric	2016 Lower Stub Shaft , weld up, true, chrome & grind	2015 - Thrust Bearing, Upper & Lower Generator Guide Bearings & Bracket Rehab - Riverside; 2015 Midbay Split Cooper Bearing	2014 - Kleinschmidt Design, Youngs Welding	2012 Refurbish
Unit #9	Harbin Electric Corporation ZDK708 - LM - 250 -	2012	Fixed Blade Propeller Runner; Product # S2012-11	2012 - New	Harbin Electric Corporation; SF 1500-44/2860; KVA 1666.7	F2012-11	1600/231.3/44 Stated FERC Capacity at standard head - 1325 kW	2012 New - Harbin Electric Corporation	2012 New - Harbin Electric Corporation		2013 - Present - continued efforts to implement a turbine guide bearing system that can handle the high sediment load	2012 - New	2012 - New
Unit #10	Harbin Electric Corporation ZDK708 - LM - 250 -	2012	Fixed Blade Propeller Runner; Product # S2012-12	2012 New	Harbin Electric Corporation; SF 1500-44/2860; KVA 1666.7	F2012 -12	1600/231.3/44 Stated FERC Capacity at standard head - 1325 kW	2012 New - Harbin Electric Corporation	2012 New - Harbin Electric Corporation		2013 - Present - continued efforts to implement a turbine guide bearing system that can handle the high sediment load	2012 - New	2012 - New
Unit #11	Leffel 57-A	1925	1969 Leffel Hybrid A	2012 Refurbished Installation	General Electric	4098038	1000 kW w. Leffel A Runner	2012 Rewind - Cole Electric	2012 Rewind - Cole Electric	2019 - Lower Stub Shaft - machine to sleeve	2015 - Thrust Bearing, Upper & Lower Generator Guide Bearings & Bracket Rehab - Riverside; 2015 Midbay Split Cooper Bearing	2014 - Kleinschmidt Design, Youngs Welding	2012 Refurbish

Appendix D – Project Operations Monitoring Plan

THE BOWERSOCK MILLS & POWER COMPANY

EXPANDED KANSAS RIVER HYDROPOWER PROJECT
Project Operations Monitoring Plan - Rubber Dam Revision
Rubber Dam Installation
FERC LICENSE P-13526
March 28th, 2015

Federal Energy Regulatory Commission
Project Operations Monitoring Plan Requirements
Expanded Kansas River Hydropower Project
Licensee P-13526

Article 402 of FERC License P-13526 issued to The Bowersock Mills & Power Company for the Expanded Kansas River Hydropower Project requires the development of a Project Operations Monitoring Plan. The following plan meets the requirements as set by FERC.

"The plan shall include, at minimum: (1) the location of gauges to record millpond elevations, flows through the turbines, and gated releases; (2) procedures to record water surface elevations at least hourly; (3) a description of how the project would be operated to maintain compliance with the ROR (run-of-river) requirement of Article 401; (4) procedures to maintain ROR operation during planned and emergency shut-downs; and (5) procedures for refilling the Bowersock Millpond in the event of flashboard collapse, while maintaining adequate flows downstream during refill to maintain aquatic resources. The plan shall detail the mechanisms and structures that would be used, including any periodic maintenance and calibration necessary for any installed devices or gauges, to ensure that the devices work properly, and shall specify how often the millpond elevations and ROR operational compliance shall be recorded.

The licensee shall prepare the plan after consultation with the Kansas Department of Health and Environment, the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service. The licensee shall include with the plan a schedule for implementing 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 a minimum of 30 days for the agencies 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 licensee's reasons, based on project-specific information."

PROJECT OPERATIONS MONITORING PLAN - Revised, 3/2015

1. Location of gauges to record millpond elevations, flows through the turbines, and gated releases.

The Bowersock Mills and Power Company (BMPC) will utilize the existing upstream USGS Lecompton Station 0689100, USGS Kansas River at Lawrence, KS Station 06891080 (Upstream of Bowersock Dam) , and the BMPC North Powerhouse millpond gauge to document river flows upstream of the Bowersock Dam, and the BMPC North Powerhouse tailwater gauge and existing USGS Kansas River at Lawrence, KS Station 06891080 (Downstream of Bowersock Dam), USGS DeSoto Station 06892350 to document river flows downstream of the Bowersock Dam. Within the North Powerhouse, three pressure transducers with manual float backup monitor the water surface elevations at 3 separate points: millpond elevation directly upstream of the North Powerhouse, elevation directly behind the North Powerhouse trash racks, and the tail water directly downstream from the North Powerhouse. In addition to the transducers and floats, BMPC will install a manual gauge directly upstream and downstream from the North Powerhouse to confirm and calibrate the transducers.

As stipulated in the Kansas Division of Water Resources Vested Right, File No. DG-11 and Appropriation of Water, File Nos. 45,444 and 47,275, flows through the turbines will be calculated by obtaining two measured values 5 days per week of data necessary to convert the kWh produced and the net head to CFS flow through the turbines. These data are documented in a table that includes the summation of the water diverted through the turbines for each right daily. Gated releases may be documented based on the difference between turbine consumption and downstream flows of the Bowersock Dam.

2. Procedures to record water surface elevations at least hourly

The water surface elevations from the transducers or floats will be recorded by the SCADA program hourly and archived for documentation as required by the Kansas Division of Water Resources. A hard copy document log will be maintained at the BMPC Data Center including daily, weekly and monthly records of operation and generation from both the North and South Powerhouses. Annual reports to the Kansas Department of Agriculture Division of Water Resources, the Energy Information Administration, and any other government agency will be based on these records. An electronic database will record and track the relevant data.

Documentation of water use through the project will be conducted in accordance with the conditions 15 and 18 of the BMPC Division of Water Resources Appropriation of Water, File No. 47,275. Condition numbers 15 and 18 read as follows:

"15. That the applicant shall maintain daily records in a table format that provides two (2) measured values for five (5) days each week obtained at least six (6) hours apart for the following: a) Total feet of head b) Millpond elevation c) Discharge (in CFS). Additionally, the table should include a daily summation of the quantity of water diverted under this appropriation since the beginning of the calendar year for each day. These records shall be submitted monthly to the Division of Water Resources, Topeka Field Office, by the 15th day of each month or upon request of the Topeka Field Office. If necessary, the Chief Engineer or his designated agent can require more frequent measurements."

"18. That the applicant shall maintain an on-site record of hourly millpond surface elevation readings, which can be readily reviewed at the request of Division of Water Resources personnel."

Reports to the Division of Water Resources are public record, and are available to any requestor under the Kansas Open Records Act (KORA). These records may be obtained through a standard KORA request to the Division of Water Resources on the appropriate form. A fee may be required to process the KORA.

While the Kansas Division of Water Resources requests only millpond elevation readings, BMPC will also take hourly tailwater elevation readings in order to meet requirements as established in Article 401 of the BMPC FERC License P-13526 which require that both millpond and tailwater be monitored, so that "at any point in time, flows, as measured immediately downstream of the project, approximate the sum of inflows to the project millpond as measured by hourly water surface elevations."

By documenting both millpond and tailwater surface elevation readings on an hourly basis, BMPC will establish clear documentation of the "run of river" nature of the operation, as per the Federal Energy Regulatory Commission recommendation that BMPC "minimize fluctuations in the millpond surface elevation."

3. A description of how the project would be operated to maintain compliance with the ROR (run-of-river) requirement of Article 401;
BMPC run of river operations are defined by the Federal Energy Regulatory Commission in the license document as follows:

"Article 401. Run-of-River Operation and Bowersock Millpond Levels. To protect aquatic resources in the Kansas River, the licensee shall operate the Expanded Kansas River Hydroelectric Project in run-of-river (ROR) mode, where instantaneous outflows approximate instantaneous inflows to the project. In addition, the licensee shall operate the project to maintain the level of the Bowersock Millpond at elevation 813.5 feet National Geodetic Vertical Datum (NGVD), with deviations no greater than plus or minus 6 inches due to operational constraints.

The licensee shall at all times act to minimize the fluctuation of the Bowersock Millpond surface elevation by maintaining a discharge from the project so that, at any point in time, flows, as measured immediately downstream of the project, approximate the sum of inflows to the project millpond as measured by hourly water surface elevations."

Under normal operations, both BMPC powerhouses will pass all river flows, such that instantaneous outflows approximate instantaneous inflows to the project. Headwater control devices mounted on the dam's crest, Elev. 808 NGVD, will raise the millpond water surface to Elev. 813.5 NGVD plus or minus 6 inches. Two types of devices installed at the dam will facilitate the passage of river flows in excess of the flows which may be passed by the powerhouses. Obermeyer Gates on the north and south ends of the dam (one 20 ft. gate at the north end and fifteen 10 ft. gates at the south end), which can be lowered and raised pneumatically, and a rubber dam, consisting of four separate air bladders, inflated with a low-pressure blower system, which may be inflated or deflated to allow the passage of excess flows. Throughout medium and low-flow conditions, all headwater control devices will be in the raised position (fully inflated), to maintain the millpond headwater at a nominal elevation of 813.5 NGVD.

The existing and new powerhouses will operate as a single unit. With larger turbine/generator sets at the North Powerhouse (maximum flow of @ 1,000 CFS for turbines 9 and 10, and 700 CFS for turbines 8 and 11), and smaller turbine/generator sets at the South Powerhouse (maximum flow of @ 300 CFS), the two powerhouses will operate in tandem to create a smooth power generation curve as flows increase in the river. As river flows increase, units will be placed into operation as indicated for maximum efficiency until all four generators from the North Powerhouse and all 7 generators from the South Powerhouse are online.

As the river flows increase beyond what the 11 turbines can pass, the South or North Obermeyer gates will lower automatically to pass excess flows. The North Obermeyer gate will use transducers and elevation set points to automatically open and close the gate to keep the millpond at elevation 813.5 plus or minus six inches. If the river flows exceed the capacity of all 11 turbines and the North Obermeyer Gates, the South Obermeyer Gates will be lowered to keep the millpond within the appropriate elevation range. The South Obermeyer Gates are automated through the use of a bubbler system. The continuous operation of both sets of Obermeyer Gates as described will allow the millpond elevation to be maintained at the nominal elevation of 813.5 up to river flows of 14,900 CFS, as the operation of the North and South

Powerhouses and both sets of Obermeyer Gates have the capacity to pass approximately 14,900 CFS.

The following table demonstrates the maximum amount of flow the BMPC Expanded Project has the capacity to pass with a river elevation of 814 NGVD.

BMPC Project Structure Flow Capacities at Elevation NGVD 814

BMPC South Powerhouse	2,000 CFS
BMPC North Powerhouse	3,400 CFS
BMPC North Obermeyer Gates	1,500 CFS
BMPC South Obermeyer Gates	8,000 CFS
Total	14,900 CFS

In the event of river flows exceeding 14,900 CFS or below (depending on debris-load in the river), BMPC powerhouse operators will initiate deflation of the rubber dam. The four separate bladders will be deflated in progression, ultimately bringing the entire dam top to its lowest point to allow maximum passage of river flows. The rubber dam bladders will be used to pass flows during high water events (above 14,900 CFS), and not to manage millpond levels. The bladders will either be inflated or deflated, and millpond management level will be maintained through management of the Obermeyer system. This method of operation will allow the downstream river flows to approximate the inflows of the project millpond and minimize any excessive surges in downstream river volume.

Once river flows reach 35,000 CFS or greater, both powerhouses would cease operations. Flows would continue to pass over the dam crest rubber dam section, lowered Obermeyer Gates and the flood passage in the North Powerhouse. Operations at both powerhouses would resume when river flows diminish to approximately 35,000 CFS or below before reinitiating operations.

As river flows recede in the river, BMPC will begin to raise the headwater control structures in progression, such that the millpond level will not go below the authorized level of 813.5 NGVD, eliminating the need for the refill period that was required with the use of manually-raised flashboards.

4. Procedures to maintain ROR operation during planned and emergency shut-downs;
Under planned or emergency shutdown of units, operation will be essentially the same as under normal operations. When the river flows exceed the capacity of the operational turbines in the North and South Powerhouses, the North or South Obermeyer Gates will automatically lower to maintain the nominal 813.5 elevation. If the river flows exceed the capacity of the operational turbines and both sets of Obermeyer Gates (or prior depending on debris-load in the river), powerhouse operators will initiate deflation of the rubber dam. The four separate bladders will be deflated in progression. In event that the rubber bladders are overtopped, a pressure sensor located on the air bladder will initiate automatic deflation, which serves as a backup mechanism, ensuring that air bladders are deflated in the event of high water.

In the event both powerhouses were to lose power, the turbines would be shut down during the outage and therefore would not pass any river flows. The Obermeyer gates would not

immediately fall, but can be lowered by use of a relief valve on the air line supply if required to pass flows. Similarly, the rubber dam air bladders have a release valve, which would allow their deflation to pass flows. If flows were low enough that the majority of the dam top water retention structures were required to maintain millpond elevation, a portable air compressor can be used for operation of both Obermeyer Gate Systems, and the rubber dam system may operate with a generator.
In the event of severe icing, BMPC will continue to operate turbines as they are practicable, and will continue to pass any additional flows as required via the Obermeyer Gate and rubber dam systems.

5. Procedures for refilling the Bowersock Millpond in the event of a maintenance-related drawdown while maintaining adequate flows downstream during refill to maintain aquatic resources; Maintaining ROR Compliance During Millpond Refills
The BMPC operation is considered by FERC to be a run-of-river operation. As with any run-of-river hydropower operation, a millpond refilling period is anticipated following any drawdown, either scheduled or the result of required emergency maintenance. Maintenance may be required on any portion of the water retention system, in the project, which includes headgates, either Obermeyer section, the rubber dam, or the dam itself.

Communication to Relevant Agencies
As directed by the Division of Water Resources and FERC License Article 401, BMPC will communicate significant anticipated or unplanned changes of 6 inches or more from the authorized millpond level of 813.5 as soon as possible, no later than 48 hours after any incident, and prior to any refilling with the following agencies:

- Kansas Department of Agriculture Division of Water Resources
- Kansas Water Office
- Kansas River Water Assurance District No. 1
- Kansas Department of Health and Environment
- US Army Corps of Engineers
- U.S. Fish & Wildlife Service
- Kansas Department of Wildlife, Parks & Tourism

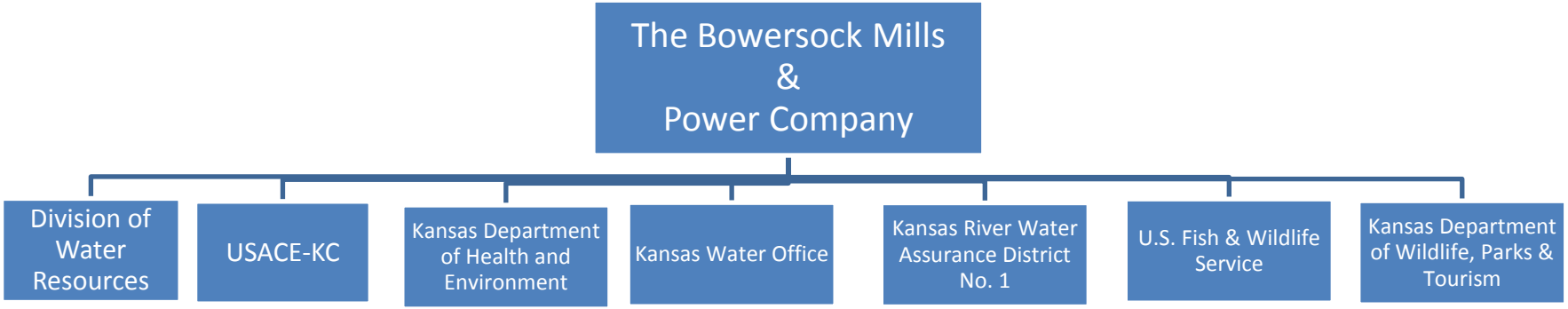
This plan of communication is as per the condition 19 of the Kansas Department of Agriculture Division of Water Resources Appropriation of water, File No. 47,275 which reads as follows:

"19. That per the requirements contained in Article 401 of the Federal Energy Regulatory Commission license for this project, the applicant [BMPC] shall operate the Expanded Kansas River Hydroelectric Project in run-of-river (ROR) mode, maintaining the level of Mill Pond at elevation 813.5 feet NGVD with deviations no greater than plus or minus 6 inches due to operational constraints. Further, in the event that the level of Mill Pond is temporarily modified per the provisions of Article 401, prior to commencing any refilling of Mill Pond the applicant shall contact the Chief Engineer, or an authorized representative of the Chief Engineer, for coordination purposes, and communicate its operational plan for refilling to the Kansas Water Office and the Kansas River Water Assurance District No. 1."

When BMPC experiences an Article 401 condition, BMPC will notify the above-named entities with the level in NGVD of current storage in the millpond, the current operation of each

powerhouse, daily diversion under each water right, and the anticipated duration and timing of the drawdown and refill. With regard to coordination of refilling, BMPC will refer to the Department of Agriculture Division of Water Resources to coordinate those discussions.

BMPC Notification Chart
Bowersock Millpond Refill



Water management on the Kansas River is a responsibility of the Kansas Department of Agriculture Division of Water Resources. As the BMPC water rights and operations are directed by Division of Water Resources, it is anticipated that BMPC will continue to report primarily to the Division of Water Resources, and will look to the Division of Water Resources for the coordination of discussion and collaboration to maintain appropriate river flows while meeting BMPC water rights under low-flow situations.

BMPC will not report significant changes in millpond level above 814 NGVD which take place at high river flows and are a reflection of natural river fluctuations and are outside the control of BMPC operations.

Refilling the Millpond Under Normal Flow Conditions (Not under Administration)

The use of automated (not requiring human power on the dam) headwater control systems will allow BMPC to eliminate many of the millpond refills that were necessary with the manually-raised flashboard system. With the new systems in place, the millpond should only require refilling in the event of required or unplanned maintenance, not as a normal course of operations as it was with the wooden flashboards. Upon completion of any required maintenance of the dam or headwater control systems, BMPC will return all headwater control structures to the raised position, and operate the powerhouses at less than river inflows to facilitate refilling the millpond responsibly to maintain aquatic resources.

Refilling of the millpond under normal flow conditions may occur under BMPC's rights, File Nos. DG-11, 45,444 and 47,275, depending on priority and plant operations. Under File Nos. 45,444 and 47,275,refilling may not interfere with target flows established for the Kansas River Water Assurance Program, meaning that storage under these rights may not result in target flows falling below threshold states in the Kansas River Water Assurance District No. 1 Operations Plan, and that in no case, may any releases from storage made pursuant to the Kansas River Water Assurance District No. 1 Operations agreement be stored in the millpond under any right at any time. Water Assurance District releases are subject to protection by the Division of Water Resources, whereby BMPC shall ensure that a quantity of water equal to or greater than the released quantity will be diverted, by passed, released or otherwise shall pass by, through, or over the Millpond Dam.

It should be noted that under any flow condition, including normal flows, that BMPC relies on three water rights, the most senior of which is Vested Right DG-11, which is of particular relevance during low-flow conditions when the river is under administration.

Refilling the Millpond Under Low Flow Conditions (Under Administration)

BMPC recognizes the importance of collaborating with all stakeholders on the Kansas River to manage water flows effectively, and has a history of over 100 years of operation with positive relationships with other river users. While underscoring the importance of clear communication with all river stakeholders, BMPC respectfully reserves the right established under its senior, Vested water right to make beneficial use of natural flows in the Kansas River to operate the BMPC Project.

In the event of a significant change in millpond level and associated need to refill, BMPC will, for the purposes of coordination, communicate the level in NGVD of current storage in the millpond,

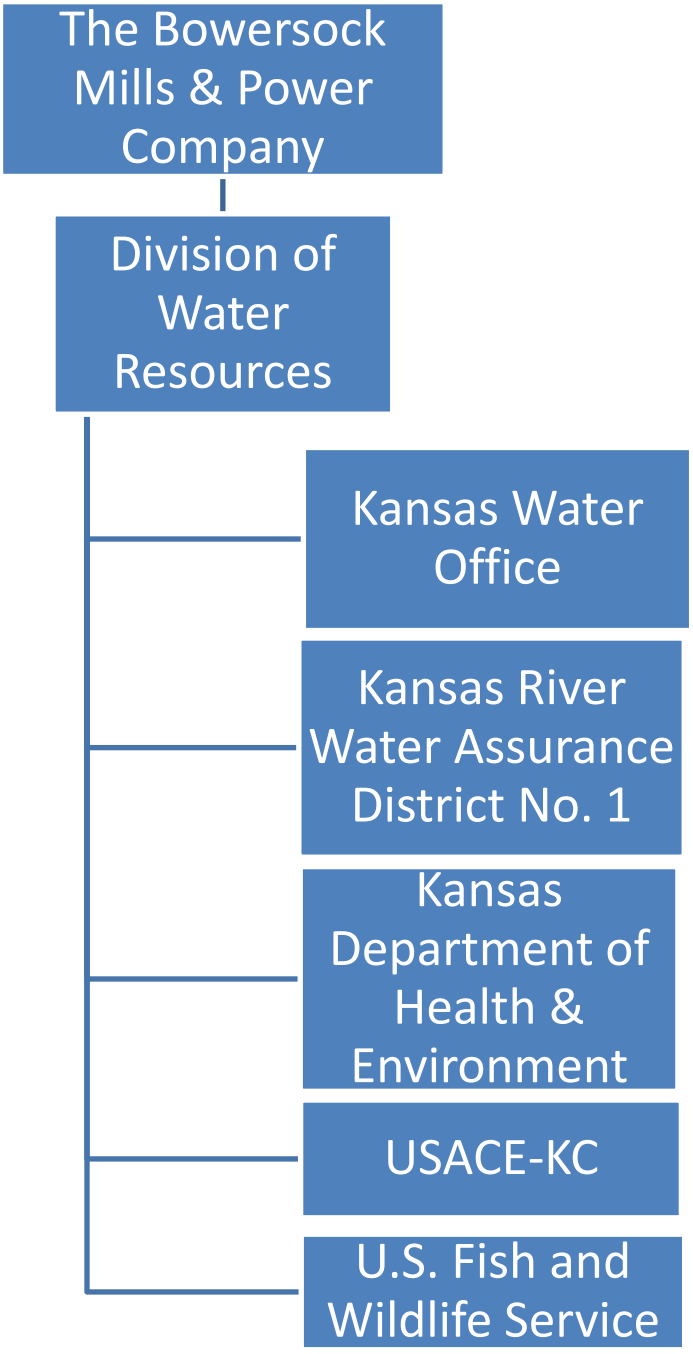
the current operation of each powerhouse, daily diversion under each water right, and the anticipated timing and duration of the fill to the Kansas Department of Agriculture Division of Water Resources, Kansas Water Office, Kansas River Water Assurance District No. 1, Kansas Department of Health and Environment, the USACE-KC and the U.S. Fish and Wildlife Service. The DWR will make determinations on which water right(s) will be storing based on this information and discussions with stakeholder agencies. The timing and duration of the proposed filling will be reviewed.

In consideration of downstream users and aquatic needs, if the proposed plan for refilling the millpond under the senior, Vested right will reduce flows below KRWAD threshold values, or if river flows are under 1500 CFS at the De Soto Gauge and BMPC anticipates deviating from run-of-river operations as defined (where instantaneous outflows approximate instantaneous inflows to the project) by more than 300 CFS or greater, BMPC will notify the above-named agencies, and then work with the Division of Water Resources (which will coordinate with KWO, KRWAD, KDHE, USACE-KC and USFWS), to determine if requesting an additional release from the Water Quality Storage portion of the Water Assurance storage pool pursuant to the upstream Reservation Rights from storage will be necessary, at which time the KWO will request any release necessary from the Army Corps of Engineers.

The Bowersock Mills and Power Company is the owner of vested water right DG-11, dated October 14th, 1959, which grants BMPC the right to "to continue the beneficial use of water from the source (Kansas River at the Bowersock Dam) as stated (which) has been determined and established to be a maximum quantity of 1,000,000 acre feet per year to be diverted at a maximum rate of 2,000 cubic feet per second for water power use." Under the Vested Right, BMPC recognizes the right to refill the Bowersock Millpond using only natural flows at any time the right is in use and, that releases made pursuant to an agreement between the state and the federal government or releases from storage under the authority of the state of Kansas are protected by the Division and may not be stored by BMPC during low flow conditions.

As previously stated, BMPC will report any significant fluctuation over 6 inches of the Bowersock Millpond which is a result of BMPC operations to the relevant, listed agencies. To illustrate, non-reportable fluctuations will occur when river flows are high, naturally above the BMPC headwater control devices, and therefore out of BMPC control. Reportable fluctuations will occur as a result of BMPC operations which alter outflows such that inflows and outflows to the project are not approximately equivalent. Any anticipated changes which are a result of BMPC operations will be communicated in advance, and any unanticipated change which is a result of BMPC operations will be communicated within 48 hours of the incident. In the event that the BMPC Millpond must be refilled when the Kansas River is under administration, every effort will be made to coordinate the refill of the millpond with other river stakeholders with the Kansas Division of Water Resources serving as the primary point of communication between BMPC and other listed river stakeholders.

Communication Flow Chart Re: Coordination of Discussion Required For Refill When River is Under Administration



For further discussion of the BMPC vested water right and Kansas Water Assurance District rights and responsibilities relevant to the BMPC Millpond, see Appendix A.

Schedule for Implementation
The BMPC Project Operations Monitoring Plan has been established for the purposes of the expansion of the BMPC Project to include a new North Powerhouse. Many aspects of the Project Operations Monitoring Plan may only be established upon completion of the North Powerhouse and associated monitoring systems. Based upon these constraints, BMPC anticipates initiating this Project Operations Monitoring Plan upon start of commercial operations of the proposed North Powerhouse.

Incorporation of Comments from Stakeholders:
In developing this Operations and Monitoring Plan, BMPC collaborated with all the agencies stipulated in the FERC license, including the Kansas Department of Health and Environment, the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service. In an effort to engage and incorporate all the stakeholders on the river, BMPC also collaborated on the development of the plan with additional stakeholder agencies, including the Kansas Division of Water Resources and the Kansas Water Office. This original, submitted version of the plan incorporated as many comments and requests from stakeholder agencies as practicable for BMPC Operations, also recognizing that requests from some agencies were in conflict with requests from other agencies. This revised version of the plan will be submitted for review and comment to the same agencies in addition to the Kansas Department of Wildlife, Parks, and Tourism.

For the full text of comments from required agencies, see the following appendices:
Kansas Department of Health and Environment – Appendix B
US Army Corps of Engineers – Appendix C
US Fish and Wildlife – Appendix D

For the full text of comments from additional agencies, see the following appendices:
Kansas Division of Water Resources – Appendix E
Kansas Water Office – Appendix F

For BMPC responses to the comments from each agency, see Appendix G.

Communication with BMPC
The Bowersock Mills and Power Company
P.O. Box 66
500 South Powerhouse Road
Lawrence, Kansas 66044
BMPC South Powerhouse: 785-843-1385
BMPC Administration: 785-766-0884
Primary Contact: Sarah Hill-Nelson
Email: shn@bowersockpower.com

Appendix E – Water Quality Standards – Additional Documentation

North Plant Cooling Water NPDES Permit
316 Clean Water Act Compliance

Technical Services Section
Bureau of Water
1000 SW Jackson St., Suite 420
Topeka, KS 66612-1367

Phone: 785-296-2856
Fax: 785-296-0086
SShoresM@kdheks.gov
www.kdheks.gov

Kansas

Susan Mosier, MD, Secretary

Department of Health & Environment

Sam Brownback, Governor

October 15, 2015

The Bowersock Mills & Power Company
Environmental Manager
500 South Powerhouse Road
Lawrence, KS 66044

RE: Kansas Water Pollution Control
Permit No. I-KS31-CO07
The Bowersock Mills & Power Company

Dear Permittee:

You have fulfilled all the filing requirements for a Kansas Water Pollution Control Permit and Authorization to Discharge under the National Pollutant Discharge Elimination System (NPDES). We are pleased to forward your new permit. While it is permissible to make as many copies as needed for monitoring and reporting purposes, you need to retain the original permit for your files.

We suggest you carefully read the terms and conditions of your permit and understand these terms and conditions are enforceable under both State and Federal law.

Please notice the reporting paragraph on page 2 of your permit, where all reports are due by the 28th day of the schedule noted. Please submit reports to the Kansas Department of Health and Environment, Bureau of Water-TSS, 1000 SW Jackson St., Suite 420, Topeka, Kansas 66612-1367.

Also, please note that if the permit requires routine monitoring and reporting, the table under section A will contain a new term called "EDMR code". This term stands for Electronic Discharge Monitoring Report and is an addition to the permits to allow all permittees, in the future, to report the discharge monitoring report data electronically instead of on paper.

If you have any questions concerning this permit, contact Shelly Shores-Miller at (785)296-2856.

Sincerely,

Michael B. Tate, P.E.
Director, Bureau of Water

pc: NE - District
JM- Permit File

KANSAS WATER POLLUTION CONTROL PERMIT AND
AUTHORIZATION TO DISCHARGE UNDER
THE NATIONAL POLLUTANT DISCHARGE
ELIMINATION SYSTEM

Pursuant to the Provisions of Kansas Statutes Annotated 65-164 and 65-165, the Federal Water Pollution Control Act as amended, (33 U.S.C. 1251 et seq; the "Act"),

Owner:	The Bowersock Mills & Power Company
Owner's Address:	500 South Powerhouse Road Lawrence, Kansas 66044
Facility Name:	Kansas River Hydropower North Plant
Facility Location:	250 North Powerhouse Road Lawrence, Kansas 66044 Latitude: 38.97583 Longitude: -95.23486
Legal Description	SW ¼ Section 30, Township 12S, Range 20E, Douglas County, Kansas
Receiving Stream:	Kansas River
River Basin:	Kansas River Basin

is authorized to discharge from the facility described herein in accordance with the requirements as set forth herein.

This permit is effective November 1, 2015, and expires October 31, 2020.

FACILITY DESCRIPTION:

This facility is composed of two, North and South, hydroelectric powerhouses. The North powerhouse has four turbine/generator sets (Units 8, 9, 10, and 11) with a generation capacity of 4.65 MW. Units 9 and 10 use up to 60 gpm each of Kansas River water or alternately City potable water to cool the generator upper guide bearing and thrust bearing oil system via an oil/water heat exchange and to cool the generator lower guide bearing oil system via a second oil/water heat exchanger. The cooling water from the two oil/water heat exchangers is combined to also water lubricate the Mid Bay Thordon Synthetic Polymer bearing and the Thordon Synthetic Polymer Guide Bearing in the Turbine Water Box. The oil bearing lubrication system for Units 8 and 11 is air cooled. Plant wastewater is routed to the City Sanitary Sewer System.

Susan K Mosier

Secretary, Kansas Department of Health and Environment

October 14, 2015
Date

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

001X1 – [EDMR Code: EFF001X1] - Discharge of Non-Contact Cooling Water

The permittee is authorized to discharge from the above named outfall in accordance with the conditions as specified herein:

The permittee shall not add to the Kansas River any materials or substances which causes a violation of Kansas Surface Water Quality Standards, K.A.R. 28-16-28b through 28-16-28e. The permittee shall not add to the cooling water the following:

a. oil or grease in concentrations which cause any visible film or sheen to form upon the surface of the receiving water;

b. oil or grease which causes a sludge or emulsion to be deposited beneath the surface of the receiving water, upon submerged substrate, or upon adjoining shorelines;

c. turbidity or color producing substances causing any change in the natural appearance of the stream or water body;

d. substances in the wastewater which cause objectionable odors in the vicinity of the receiving water;

e. floating debris, scum, foam, froth, or other floating material in other than trace amounts; or

f. materials which create deposits of sludge or fine solids causing aesthetic or environmental concerns downstream of the outfall.

The permittee shall monthly inspect the outfall(s) and receiving stream(s) to ensure compliance with the above Water Quality Standards. The permittee shall maintain a log documenting the results of any monitoring or inspections performed and shall provide the log to KDHE staff for review upon request.

Any violation of the above general Water Quality Standards shall be reported within 24 hours of discovery, to either the Kansas Department of Health and Environment, Division of Environment at (785) 296-5517 or the appropriate KDHE District Office followed by a letter, within 5 days of discovery, explaining the cause of the water quality violation, the actions taken to correct the violation, and actions taken to prevent recurrence.

B. STANDARD CONDITIONS

In addition to the specified conditions stated herein, the permittee shall comply with the attached Standard Conditions dated August 1, 2010.

C. SCHEDULE OF COMPLIANCE

None

D. SUPPLEMENTAL CONDITIONS

1. This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301 (b)(2), (C), and (D), 304 (b)(2), and 307 (a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

   a. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit, or

   b. Controls any pollutant not limited in the permit.

   The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

2. Changes in Discharges of Pollutant Substances. The permittee shall notify the Director as soon as it knows or has reason to believe:

   a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

      i. One hundred micrograms per liter (100 :g/l);

      ii. Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

      iii. Five (5) times the maximum concentration value reported for that pollutant in the permit application.

   b. That any activity has occurred or will occur which result in any discharge, on a non-routine or infrequent basis, of a pollutant which is not limited in the permit if that discharge will exceed the highest of the following notification levels".

      i. Five hundred micrograms per liter (500 ug/l);

      ii. One milligram per liter (1 mg/l) for antimony;

      iii. Ten (10) times the maximum concentration value reported for that pollutant in the permit application.

3. In the event the Environmental Protection Agency amends or promulgates the BPT, BAT, and/or BCT effluent guideline limitations for a specific Point Source Category or any of the subcategories covering your industry, this permit will be revoked and reissued to incorporate the new limitation(s).

4. Toxic Substances - Water Treatment Additives. If the permittee utilizes or changes water treatment additives:

a. After the mixing zone provided by Kansas Water Quality Standards, the discharge of water treatment additives shall not be harmful to human, animal or plant life uses in the receiving water.

b. The permittee shall keep an ongoing log of the water treatment chemicals used, their potential concentration in the facility discharge, and the associated toxicity data for each chemical. A sample chemical additives evaluation log can be obtained from KDHE.

The permittee shall provide KDHE, upon request, toxicity tests and/or a chemical additives evaluation log the permittee uses to determine if the requirements in the paragraphs above are being achieved. In the event the data indicate the requirements in the paragraphs above are not achieved, KDHE reserves the right to amend the facility's NPDES permit to specify additional terms and conditions for toxic substances.

5. The use of City of Lawrence water for bearing cooling is an alternative to the use of Kansas River water for bearing oil cooling. Permittee will notify KDHE – Bureau of Water via email in accordance with incident procedures under Standard Condition No. 10 when City water supply is used for bearing oil cooling.

STANDARD CONDITIONS FOR
KANSAS WATER POLLUTION CONTROL AND
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMITS

1. Representative Sampling and Discharge Monitoring Report Submittals:

A. Samples and measurements taken as required herein shall be representative of the quality and quantity of the monitored discharge. Test results shall be recorded for the day the samples were taken. If sampling for a parameter was conducted across more than one calendar day, the test results may be recorded for the day sampling was started or ended. All samples shall be taken at the locations designated in this permit, and unless specified, at the outfall/monitoring location(s) before the wastewater joins or is diluted by any other water or substance.

B. Monitoring results shall be recorded and reported on forms acceptable to the Division and postmarked no later than the 28th day of the month following the completed reporting period. Signed and certified copies of these, prepared in accordance with KAR 28-16-59, and all other reports required herein, may be FAXed to 785.296.0086, e-mailed as scanned attachments to dmr4kdhe@kdheks.gov , or sent by U.S. mail to:

Kansas Department of Health & Environment
Bureau of Water-Technical Services Section
1000 SW Jackson Street, Suite 420
Topeka, KS 66612-1367

2. Definitions:

A. Unless otherwise specifically defined in this permit, the following definitions apply:

1. The "Daily Maximum" is the total discharge by weight or average concentration, measurement taken, or value calculated during a 24-hour period. The parameter, pH, is limited as a range between and including the values shown.

2. The "Weekly Average" is the arithmetic mean of the value of test results from samples collected, measurements taken or values calculated during four monitoring periods in each month consisting of calendar days 1-7, 8-14, 15-21 and 22 through the end of the month.

3. The "Monthly Average", other than for E. coli bacteria, is the arithmetic mean of the value of test results from samples collected, measurements taken or values calculated during a calendar month. The monthly average is determined by the summation of all calculated values or measured test results divided by the number of calculated values or test results reported for that parameter during the calendar month. The monthly average for E. coli bacteria is the geometric average of the value of the test results from samples collected in a calendar month. The geometric average can be calculated by using a scientific calculator to multiply all the E. coli test results together and then taking the nth root of the product where n is the number of test results. Non-detect values shall be reported using the less than symbol (<) and the minimum detection or reportable value. To calculate average values, non-detects shall be defaulted to zero (or one for geometric averages). Greater than values shall be reported using the greater than symbol (>) and the reported value. To calculate average values, the greater than reported value shall be used in the averaging calculation.

B. A "grab sample" is an individual sample collected in less than 15 minutes. A "composite sample" is a combination of individual samples in which the volume of each individual sample is proportional to the flow, or the sample frequency is proportioned to the flow rate over the sample period, or the sample frequency is proportional to time.

C. The terms "Director", "Division", and "Department" refer to the Director, Division of Environment, Kansas Department of Health and Environment, respectively.

D. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of an in-plant diversion. Severe property damage does not mean economic loss caused by delays in production.

E. "Bypass" means the intentional diversion of waste streams from any portion of the treatment facility.

3. Schedule of Compliance: No later than 14 calendar days following each date identified in the "Schedule of Compliance," the permittee shall submit via mail, e-mail or fax per paragraph 1.B above, either a report of progress or, in the case of specific action being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements, or, if there are no more scheduled requirements, when such noncompliance will be corrected.

4. Test Procedures: All analyses required by this permit shall conform to the requirements of 40 CFR Part 136, unless otherwise specified, and shall be conducted in a laboratory accredited by the Department. For each measurement or sample, the permittee shall record the exact place, date, and time of measuring/sampling; the date and time of the analyses, the analytical techniques or methods used, minimum detection or reportable level, and the individual(s) who performed the measuring/sampling and analysis and, the results. If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved procedures, the results shall be included in the Discharge Monitoring Report form required in 1.B. above. Such increased frequencies shall also be indicated.

5. Change in Discharge: All discharges authorized herein shall be consistent with the permit requirements. The discharge of any pollutant not authorized by this permit or of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of this permit. Any anticipated facility expansions, production or flow increases, or production or wastewater treatment system modifications which result in a new, different, or increased discharge of pollutants shall be reported to the Division at least one hundred eighty (180) days before such change.

6. Facilities Operation: The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the requirements of this permit and Kansas and Federal law. Proper operation and maintenance also include adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the requirements of this permit. The permittee shall take all necessary steps to minimize or prevent any adverse impact to human health or the environment resulting from noncompliance with any effluent limits specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. When necessary to maintain compliance with the permit requirements, the permittee shall halt or reduce those activities under its control which generate wastewater routed to this facility.

7. Incidents:

"Collection System Diversion" means the diversion of wastewater from any portion of the collection system.

"In-Plant Diversion" means routing the wastewater around any treatment unit in the treatment facility through which it would normally flow.

"In-Plant Flow Through" means an incident in which the wastewater continues to be routed through the equipment even though full treatment is not being accomplished because of equipment failure for any reason.

"Spill" means any discharge of wastewater, sludge or other materials from the treatment facility other than effluent or as more specifically described by other "Incidents" terms.

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance or anticipated noncompliance with permit effluent limits because of factors beyond the reasonable control of the permittee, as described by 40 C.F.R. 122.41(n).

8. Diversions not Exceeding Limits: The permittee may allow any diversion to occur which does not cause effluent limits to be exceeded, but only if it also is for essential maintenance to assure efficient operation. Such diversions are not subject to the Incident Reporting requirements shown below.

9. Prohibition of an In-Plant Diversion: Any in-plant diversion from facilities necessary to maintain compliance with this permit is prohibited, except: (a) where the in-plant diversion was unavoidable to prevent loss of life, personal injury, or severe property damage; (b) where there were no feasible alternatives to the in-plant diversion, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime and (c) the permittee submitted a notice as required in the Incident Reporting paragraph below. The Director may approve an anticipated in-plant diversion, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above.

10. Incident Reporting: The permittee shall report any unanticipated collection system diversion, in-plant diversion, in-plant flow through occurrences, spill, upset or any violation of a permitted daily maximum limit within 24 hours from the time the permittee became aware of the incident. A written submission shall be provided within 5 days of the time the permittee became aware of the incident. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times; and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. An Incident Report form is available at www.kdheks.gov/water/tech.html.

    For an anticipated incident or any planned changes or activities in the permitted facility that may result in noncompliance with the permit requirements, the permittee shall submit written notice, if possible, at least ten days before the date of the event.

    For other noncompliance, the above information shall be provided with the next Discharge Monitoring Report.

11. Removed Substances: Solids, sludges, filter backwash, or other pollutants removed in the course of treatment of water shall be utilized or disposed of in a manner acceptable to the Division.

12. Power Failures: The permittee shall provide an alternative power source sufficient to operate the wastewater control facilities or otherwise control pollution and all discharges upon the loss of the primary source of power to the wastewater control facilities.

13. Right of Entry: The permittee shall allow authorized representatives of the Division of Environment or the Environmental Protection Agency upon the presentation of credentials, to enter upon the permittee's premises where an effluent source is located, or in which are located any records required by this permit, and at reasonable times, to have access to and copy any records required by this permit, to inspect any facilities, monitoring equipment or monitoring method required in this permit, and to sample any influents to, discharges from or materials in the wastewater facilities.

14. Transfer of Ownership: The permittee shall notify the succeeding owner or controlling person of the existence of this permit by certified letter, a copy of which shall be forwarded to the Division. The succeeding owner shall secure a new permit. This permit is not transferable to any person except after notice and approval by the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary.

15. Records Retention: Unless otherwise specified, all records and information resulting from the monitoring activities required by this permit, including all records of analyses and calibration and maintenance of instruments and recordings from continuous monitoring instruments, shall be retained for a minimum of 3 years, or longer if requested by the Division. Biosolids/sludge records and information are required to be kept for a minimum of 5 years , or longer if requested by the Division. Groundwater monitoring data, including background samples results, shall be kept for the life of the facility regardless of ownership.

16. Availability of Records: Except for data determined to be confidential under 33 USC Section 1318, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department. Effluent data shall not be considered confidential. Knowingly making any false statement on any such report or tampering with equipment to falsify data may result in the imposition of criminal penalties as provided for in 33 USC Section 1319 and KSA 65-170c.

17. Permit Modifications and Terminations: As provided by KAR 28-16-62, after notice and opportunity for a hearing, this permit may be modified, suspended or revoked or terminated in whole or in part during its term for cause as provided, but not limited to those set forth in KAR 28-16-62 and KAR 28-16-28b through g. The permittee shall furnish to the Director, within a reasonable amount of time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish upon request, copies of all records required to be kept by this permit. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

18. Toxic Pollutants: Notwithstanding paragraph 17 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified at such effluent standards) is established under 33 USC Section 1317(a) for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition. Nothing in this permit relieves the permittee from complying with federal toxic effluent standards as promulgated pursuant to 33 USC Section 1317.

19. Administrative, Civil and Criminal Liability: The permittee shall comply with all requirements of this permit. Except as authorized in paragraph 9 above, nothing in this permit shall be construed to relieve the permittee from administrative, civil or criminal penalties for noncompliance as provided for in KSA 65-161 et seq., and 33 USC Section 1319.

20. Oil and Hazardous Substance Liability: Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject to under 33 USC Section 1321 or KSA 65-164 et seq. A municipal permittee shall promptly notify the Division by telephone upon discovering crude oil or any petroleum derivative in its sewer system or wastewater treatment facilities.

21. Industrial Users: A municipal permittee shall require any industrial user of the treatment works to comply with 33 USC Section 1317, 1318 and any industrial user of storm sewers to comply with 33 USC Section 1308.

22. Property Rights: The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights nor any infringements of or violation of federal, state or local laws or regulations.

23. Operator Certification: The permittee shall, if required, ensure the wastewater facilities are under the supervision of an operator certified by the Department. If the permittee does not have a certified operator or loses its certified operator, appropriate steps shall be taken to obtain a certified operator as required by KAR 28-16-30 et seq.

24. Severability: The provisions of this permit are severable. If any provision of this permit or any circumstance is held invalid, the application of such provision to other circumstances and the remainder of the permit shall not be affected thereby.

25. Removal from Service: The permittee shall inform the Division at least three months before a pumping station, treatment unit, or any other part of the treatment facility permitted by this permit is to be removed from service and shall make arrangements acceptable to the Division to decommission the facility or part of the facility being removed from service such that the public health and waters of the state are protected.

26. Duty to Reapply: A permit holder wishing to continue any activity regulated by this permit after the expiration date, must apply for a new permit at least 180 days prior to expiration of the permit.

Sarah Hill-Nelson

From: Don Carlson [KDHE] <Don.Carlson@ks.gov>
Sent: Thursday, November 14, 2019 3:13 PM
To: Sarah Hill-Nelson
Cc: Eric Staab [KDHE]; Shelly Shores-Miller [KDHE]
Subject: RE: BMPC Cooling System

Sarah:

Thanks for the follow-up email regarding Units #8 and #11. Initially when the NPDES permit was drafted, it was everyone's understanding the units could be effectively air cooled and use of City water was an alternative backup. With the start-up and operation of the units it was ultimately determined that air cooling simply was no sufficient to provide for the required cooling. We appreciate your advising of the need to utilize City water whenever Units #8 or #11 are operated. Eric Staab of my staff has been assigned to address reissuance of the permit and has been informed of our conversation regarding use of City water for the two units and will be addressed at the time we reissue the permit. Until the permit is reissued, there is no need for you to contact KDHE, per Supplemental Condition 5, whenever City water is used for cooling purposes.

Donald R. Carlson, PE
Kansas Department of Health and Environment
Bureau of Water - Industrial Programs Section
1000 SW Jackson, Suite 420
Topeka, Kansas 66612-1367
(785) 296-5547
(785) 296-0086 Fax
Don.Carlson@ks.gov

From: Sarah Hill-Nelson [mailto:shn@bowersockpower.com]
Sent: Wednesday, November 13, 2019 4:24 PM
To: Don Carlson [KDHE] <Don.Carlson@ks.gov>
Subject: BMPC Cooling System

Don thank you for your time on the telephone today.
I am confirming that we discussed the current cooling methods at the North Powerhouse.
As discussed, Units #9 and #10 cool via river water and there are no changes to that system.
Units #8 and #11 use 10-15 gpm of city water each, for a total maximum discharge of 20-30 gpm when both units are online.
We confirmed that this use was de minimus in relation to Kansas River flows and in keeping with the current BMPC Kansas Water Pollution Control Permit No.1-KS31-CO-07, but that upon reapplication Bowersock will clarify that the city water is in use at any time that Unit #8 or Unit #11 are in operation.
Again thank you for your guidance.
Please do not hesitate to contact me with any questions for further comments.
Sincerely,
Sarah Hill-Nelson

The Bowersock Mills and Power Company
P.O. Box 66
500 South Powerhouse Road
Lawrence, Kansas 66044
Office/Mobile: 785-766-0884
shn@bowersockpower.com
www.bowersockpower.com
"Producing clean, renewable hydropower since 1874."

STATE OF KANSAS

DEPARTMENT OF HEALTH AND ENVIRONMENT
DIVISION OF ENVIRONMENT
CURTIS STATE OFFICE BUILDING
1000 SW JACKSON ST., SUITE 400
TOPEKA, KS 66612-1367

PHONE: (785) 296-1535
FAX: (785) 559-4264
WWW.KDHEKS.GOV

GOVERNOR JEFF COLYER, M.D.
JEFF ANDERSEN, SECRETARY

October 12, 2018

Ms. Sarah Hill-Nelson
The Bowersock Mills & Power Company
P.O. Box 66
Lawrence, Kansas 66044

Re: The Bowersock Mills & Power Company – Lawrence, Kansas
CWA Section 316(b) Determination Letter

Dear Ms. Nelson:

On September 4, 2018, The Bowersock Mills & Power Company (BMPC), at the request of the Kansas Department of Health and Environment (KDHE), submitted information regarding the operation of their hydroelectric facility located on the Kansas River in Lawrence, Kansas. KDHE's request was the result of information obtained during a July 26, 2018 conference call between U.S. Environmental Protection Agency (EPA) Headquarters staff and State National Pollutant Discharge Elimination System (NPDES) permit writers responsible for implementation of the Steam Electric Effluent Guideline Standards addressing wastewater discharges from power plants and the Clean Water Act (CWA) Section 316(b) provisions addressing regulation of cooling water intake structures (CWISs). The focus of the EPA 316(b) regulations is to minimize the impact to aquatic organisms and threatened and endangered species resulting from the location, design, and operation of CWISs utilized for providing cooling water for commercial and industrial manufacturing and production operations. The intent of the regulations is to minimize impingement (entrapment on the surface of an intake screen or structure) and entrainment (the passage of aquatic eggs. larvae, and small fish through the cooling water system exposing the entrained organisms to mechanical impacts from pumps, increased pressures, and elevated temperatures) where injury or death could result. The CWA 316(b) regulations are in 40 CFR Part 125 Subpart I for new facilities and 40 CFR Part 125 Subpart J for existing facilities. NPDES permit application requirements for 316(b) can be found in 40 CFR Part 122.21(r). During the July 26, 2018 conference call, EPA noted that hydroelectric facilities that utilize cooling water, where the water being utilized is being withdrawn from the waterbody on which the hydroelectric facility is located, may be subject to the regulatory requirements of 316(b). While it is not expected that many hydroelectric facilities will trigger the regulatory provisions of either 40 CFR Part 125 Subpart I or Subpart J, consideration of applicable Impingement and Entrainment (I/E) Mortality regulations promulgated by EPA, they would still be subject to possible I/E mortality requirements based upon the NPDES permit writers best professional judgment (BPJ) when considered on a case-by-case basis. For the record, it is noted that in a July 11, 2018 letter to the EPA Region 10 Office, the National Hydropower Association and the Utility Water Act Group submitted comments addressing the proposed issuance of an NPDES General Permit for Hydroelectric Facilities Within the State of Idaho addressing 316(b) regulatory requirements. In the proposed 316(b) regulations published in the April 20, 2011 Federal Register (Page 22190) it states, "Given the diversity of industrial processes across the U.S., there are many other industrial uses of water not intended to be addressed by today's proposed rule. Emergency water withdrawals, such as fire control systems and nuclear safety systems, are not considered as part of a facility's design intake flow. Warming water at liquefied natural gas terminals, and hydro-electric plant withdrawals for electricity generation are not cooling water uses and are not addressed by today's proposal." Industry groups reportedly

met with EPA Headquarters staff in the last week of August 2018 to discuss the proposed EPA Region 10 general permit and their contention the regulatory preamble of the EPA April 20, 2011 proposed rule indicated that hydroelectric facilities are not addressed by the 316(b) regulations.

Based upon the July 26, 2018, EPA/NPDES State permit writers conference call, EPA Headquarters staff noted that 316(b) regulatory issues associated with hydroelectric facilities are becoming more prominent nationally and wanted to remind States they may have facilities subject to 316(b) regulatory requirements, regardless of the volume of water withdrawn by the facility for cooling water purposes. With the development and construction of the North Powerhouse Project, KDHE became aware of cooling water discharges associated with the proposed generating units. Subsequently, an NPDES Permit (I-KS31-CO07) for the cooling water discharges was developed and issued effective November 1, 2015 with the permit scheduled to expire October 31, 2020. Water for Units 9 and 10 use river water as a source while the other two units (Units 8 and 11) use potable water from the City of Lawrence as their source. Following the EPA/NPDES State call, we reviewed the NPDES permit file information along with the FERC Application originally submitted to the Federal Energy Regulatory Commission (FERC) dated February 8, 2010. Based upon our review, it was apparent that because of the small cooling water flows involved, any 316(b) determinations would be based upon the permit writers best professional judgment (BPJ) and site-specific considerations. While the NPDES permit and FERC applications did not specifically address 316(b) permit information to the degree outlined in the application regulation in 40 CFR 122.21(r), it contained significant information regarding the operation of the hydroelectric facility and environmental information developed as a part of the formal review of the North Powerhouse Project. The Bowersock facility is not subject to EPA's 316(b) regulatory provisions regarding the submission of specific permit application information, impingement requirements, or entrainment provisions. In addition to the NPDES permit file and FERC Application, a significant piece of information needed for the 316(b) review was information regarding the screen utilized for the submersible cooling water pumps employed. Information regarding the screen was requested by KDHE by telephone on August 17, 2018 and was received September 4, 2018.

INFORMATION SUMMARY

The Bowersock Dam was originally constructed in 1874 for generating mechanical energy. The Bowersock Dam has been owned by The Bowersock Mills and Power Company since the late 1800's. Today the purpose of the Bowersock Dam is fivefold: protection of the water supply for the City of Lawrence, Kansas; generation of hydroelectric energy - 2.15 MW on the south side of the river (BMPC South) and 4.65 MW on the north side of the river (BMPC North); public recreation; protection of existing Kansas Department of Transportation bridge piers; and protection from streambed degradation for the upper reaches of the Kansas River. The length of the dam is approximately 665 feet long. Its height is approximately 23 feet measured from the dam's crest to its toe when the flashboards are down and 28.5 feet when the flashboards are raised. The southern 1/3 of the dam is masonry block construction, and rests on bedrock. The northern 2/3 of the dam is timber-crib construction. The upstream face of the dam has silted in, resulting a river-bottom on the upstream face of the dam that measures an average elevation of 805 feet NGVD across the length of the dam, with an average depth of 3 feet. Under a 1977 agreement, the City of Lawrence is responsible for maintenance of the Bowersock Dam.

The South Powerhouse has been in operation since 1905. The South Powerhouse houses seven turbine generator units. All seven turbine units are air cooled. The North Powerhouse contains 4 turbine/generator units. The operation of the facility maintains a water surface elevation of 813.5 NGVD (plus or minus 6 inches). The intake system of the North Powerhouse (Forebay Area) is an open flume with trash racks along the west face of the powerhouse facing upstream/west along the length of the powerhouse. Flows on the Kansas River at Lecompton (the nearest river gauge upstream of Bowersock Dam) as set by the Kansas River Water Assurance District for the Kansas River vary seasonally but for practical purposes BMPC plans for the lowest operational flows at 800 cfs. For comparison purposes, the minimum recorded flow is 600 cfs, the mean recorded flow is 7,404 cfs, the median flow for the period of record is 3,373 cfs, and the maximum recorded flow is 483,000 cfs (1951 flood). At a minimum operating flow of 800 cfs, BMPC runs only one of the larger

turbines in the North Powerhouse or, alternatively, 3 small turbines in the South Powerhouse. If the South Powerhouse is utilized at low operating flow, there are no cooling water withdrawals as all the units are air cooled. If either Units 8 or 11 in the North Powerhouse are utilized at low operating flow, there are no cooling water withdrawals as these units utilize City water for cooling purposes. If either Unit 9 or 10 in the North Powerhouse is utilized at low operating flow the DIF for the single unit operation would be 60 gpm (0.134 cfs). If for any reason both Units 9 and 10 were employed at the low operating flow, the DIF of the combined flow would only be 120 gpm (0.268 cfs).

The cooling water intake system serving Units 9 and 10 in the North Powerhouse consists of a 60 gpm submersible pump for each unit. The submersible pumps are each housed in a 12-inch diameter Johnson Well Screen. The well screen is a Free-Flow 304 Stainless Steel Screen with a continuous Vee-Wire slot design with a 0.025-inch slot size. The intake area of the well screen is calculated to be 68.5 square inches per foot of screen length. For each unit, 2 8-foot sections of well screen were bolted together for use. The well screens were installed so they would be completely submerged, even at the low operating flow river surface elevation. The submersible pumps are located near the bottom of the well screen. Based upon the well screen slot width, diameter, and considering a maximum through-screen velocity of 0.5 fps, it would require less than 1 foot of well screen to produce a 60 gpm flow for cooling purposes. With Unit 9 and 10 each having 16 feet of submerged well screen available, the through screen velocity, even with a 50% surface blockage, would provide a through-screen velocity less than 0.5 fps. Operation with one unit at 60 gpm would result in the withdrawal of only 0.071% of the total river volume at the low operating flow of 800 cfs. The well screens are designed to be cleaned utilizing compressed air bursts.

The February 8, 2010 FERC Application developed for the North Powerhouse Project contained information detailing aquatic and terrestrial wildlife known to exist upstream, downstream and the proposed project site for the North Powerhouse. The listing also identified threatened and endangered (T&E) species as well as critical habitat. The key issue associated with wildlife for the North Powerhouse Project at that time was a desire not to install a fish ladder, at this time, to enable Bowersock Dam to continue acting as a barrier for upstream movement of Asian carp. No T&E or critical habitat issues were noted. While technically this facility, based upon the site specific 316(b) conditions does not require, as a part of the 316(b) NPDES permitting regulations review by the US Fish and Wildlife Service or the Kansas Department of Health and Environment, KDHE offered both agencies the opportunity to review and provide input on the NPDES permit information, the 2010 FERC Application, and this letter for possible comments, recommendations, or concerns.

SUMMARY

EPA contends that any facility withdrawing cooling water from a Water of the United States is subject to CWA Section 316(b). The hydroelectric industry representatives contend the preamble to the April 20, 2011 Cooling Water Intake Proposed Rule exempts hydroelectric plants from 316(b) regulatory requirements. If the industry prevails in their contention, this review is moot and any conditions or requirements in the NPDES permit associated with 316(b) can/will be removed. If EPA prevails, this review provides the permitting authorities' 316(b) Impingement and Entrainment Mortality determination employing BPJ on a site-specific case-by-case basis.

While the North Powerhouse CWIS construction commenced after January 17, 2002, KDHE does not consider it to be subject to the provisions of 40 CFR Part 125, Subpart I for new facilities. The definition of "new facility" in 40 CFR 125.83 does not pertain as it states, "New facility does not include new units that are added to a facility for purposes of the same general industrial operation (for example, a new peaking unit at an electrical generating station)." Also in 40 CFR Part 125.83 for the definition of "new facility", paragraphs (2) and (2)(i) state, "(2) Examples of facilities that would not be considered a 'new facility' include, but are not limited to, the following scenarios: (i) A facility in commercial or industrial operation is modified and either continues to use its original cooling water intake structure or uses a new or modified cooling water intake structure." As noted in the above text, the South Powerhouse has been in existence and producing electricity

since 1905. The addition of the North Powerhouse is a modification of the existing facility including the addition of a new CWIS.

KDHE does not consider the North Powerhouse to be a new unit at an existing facility. 40 CFR Part 125.92(u), the definition of "new unit" states, "New unit means a new 'stand-alone' unit at an existing facility where construction of the new unit begins after October 14, 2014 (note ribbon cutting for the North Powerhouse was held May 10, 2013) and that does nor otherwise meet the definition of a new facility at §125.83 or is not otherwise already subject to subpart I of this part. A stand-alone unit is a separate unit that is added to a facility for either the same general industrial operation or another purpose. A new unit may have its own dedicated cooling water intake structure, or the new unit may use an existing or modified cooling water intake structure." KDHE does not consider the North Powerhouse to be a "new unit" at an existing facility. The Bowersock Dam and the South Powerhouse have been producing electricity since 1905. A key component of the hydroelectric operation is the Bowersock Dam which controls the water surface elevation behind the dam. Production of electricity by the North Powerhouse would not be possible without the presence of the Bowersock Dam (part of the existing facility). Additionally, commencement of construction was initiated prior to October 14, 2014, and it does not meet the definition of "new facility" under 40 CFR Part 125, Subpart I. We consider the North Powerhouse to be a modification of an existing facility.

Regardless, the North Powerhouse cooling water intake structures do not meet the threshold requirements regarding the amount of water withdrawn (has a design intake flow greater than 2 MGD) in 40 CFR 125.81(a) for "new facilities" or 40 CFR 125.91(a)(2) for "existing facilities". As such, Bowersock must meet CWA Section 316(b) requirements established by the permitting authority (KDHE) on a site-specific, case-by-case, best professional judgment (BPJ) basis. Each of the 2 submersible pumps, housed in their own separate well screen are rated at 60 gpm (0.086 MGD) i.e., total DIF is 120 gpm (0.173 MGD).

The submersible pumps are located within a 12-inch diameter stainless steel Johnson Screens continuous Vee-Wire slotted well screen with a 0.025-inch slot size. While the length of the slot opening would exceed the 0.56-inch maximum opening for retaining impinged organisms referenced in the 316(b) final rule, that when considering the DIF per pump is only 60 gpm (0.0864 MGD or 0.1337 cfs), the maximum slot vertical opening is only 0.025 inches, and requiring a maximum through screen velocity to be 0.5 fps, only 0.56 feet of 12-inch diameter well screen would be required to satisfy the 0.5 fps through screen velocity, assuming the screen is 100% open. The well screen installation per pump involves 2 8-foot sections of well screen bolted together with 100% submergence, even at the low operating river flow of 800 cfs. It is KDHE's determination the design meets the intent of the 316(b) impingement mortality design requirements. When considering the well screen slot opening is only 0.025 inches, the DIF flow per pump is only 60 gpm (0.1337 cfs), and volume of river water being withdrawn, even at the minimum operating river flow of 800 cfs, the impact on stream flow and the degree to which there is a potential for entrainment impacts is minimal.

The environmental review contained in the FERC Application provided a summary of aquatic and terrestrial organism found upstream, downstream, and at the Bowersock Dam as well as any T&E species or critical habitat. No issues regarding threatened or endangered (T&E) species or critical habitat were noted.

Based upon our review of the information in the February 8, 2010 FERC Application, the NPDES permit file, and the September 4, 2018 email regarding the pump well screen, it is KDHE's best professional judgment (BPJ) determination that The Bowersock Mills & Power Company's cooling water system and the way it is being operated constitute a site-specific Best Technology Available (BTA) for both 316(b) Impingement and Entrainment Mortality at Bowersock.

The renewal or modification of the current NPDES permit will include provisions reflecting the above determinations and include 2 new provisions. A condition will be added requiring that if the cooling water system is to be modified or replaced, that KDHE be notified and allowed to review the proposed modification or replacement to ensure compliance with the provisions of 316(b). An additional provision will also be added

addressing T&E Species. The text will state, "Nothing in this permit authorizes take for the purposes of a facility's compliance with the Endangered Species Act."

Should you have any questions regarding this letter, please feel free to call me at (785) 296-5547 or email me at Don.Carlson@ks.gov .

Sincerely yours,

Donald R. Carlson, P.E., Chief
Industrial Program Section
Bureau of Water

c. John Dunn – EPA Region VII – Lenexa, KS
Jason Luginbill – US FWS – Manhattan, KS
Jordan Hofmeier – KDWP&T – Pratt, KS

Appendix F – Fish Passage Documentation

Operations Office
512 SE 25th Ave.
Pratt, KS 67124-8174

Kansas
Department of Wildlife, Parks and Tourism

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Brad Loveless, Secretary

Laura Kelly, Governor

17 December 2019

Sarah Hill-Nelson
The Bowersock Mills and Power Company
shn@bowersockpower.com

Dear Ms. Hill-Nelson,

RE: Bowersock Low Impact Re-certification

This letter provides a summary of aquatic resource concerns for the purposes of Bowersock Mills and Power Company low impact recertification. In an email dated 11/13/19, the Kansas Department of Wildlife, Parks, and Tourism was specifically asked to address 1. Upstream fish passage; 2. Downstream fish passage; and 3. Recommendations regarding the American Eel.

Bowersock Dam undoubtedly acts as a barrier to upstream fish passage in the Kansas River. However, at this time, there is consensus within the agency that an aquatic organism passage structure could increase impacts to upstream systems due to the potential spread of Aquatic Nuisance Species. Such a structure is therefore currently discouraged because the dam currently operates as an impediment to the spread of Silver and Bighead Carp (collectively, Asian Carp). As of the writing of this letter, a total of 6 Bighead Carp have been documented above Bowersock Dam. Based on their sizes and some aging analysis, it is currently believed those fish moved above the dam during the 1993 flood. Regular electrofishing samples have been conducted above the dam most years since 2012, with intensive efforts in 2018 and 2019. Samples of stilling basins upstream of the dam during fish salvages have not yielded Asian Carp. No evidence of reproduction or recruitment has been documented. Recent eDNA samples from 2012 and 2018 were negative (2019 results pending), further indicating there is not an established population of Asian Carp above Bowersock Dam. Integrating one or more of the many technologies available (acoustics, bubbles, CO2, electricity, etc.) to prevent or reduce the spread of aquatic invasive species could improve the efficacy of this facility at impeding Asian Carp during high flows. If Asian Carp become established above Bowersock Dam, the value of the structure as a barrier to invasive species could become questionable.

To our knowledge, downstream fish passage and associated impingement/entrainment have not been evaluated for Bowersock Mills and Power Company. While we would encourage site-specific research to be completed regarding impingement and entrainment, we do acknowledge that the impounded river upstream of the dam does not represent high quality habitat for state-listed species and the likelihood of adult fish or eggs of those species being impinged/entrained could be relatively low. Additionally, the hydropower facility does not occupy the entire width of the river, further reducing potential for impingement/entrainment.

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Brad Loveless, Secretary

Laura Kelly, Governor

American Eels historically occurred in Arkansas and Kansas river basins in Kansas. Most recently, 1 American Eel was caught on rod & reel below Bowersock Dam in 2015. Otherwise the most recent records of the species in the Kansas River Basin were a rod & reel capture in Wilson Reservoir spillway (2005), a rod & reel capture in the Kansas River (unspecified location, 1987), and a biologist observation of 2 individuals in the supply lake of Milford Fish Hatchery (1987). American Eel are considered a Species of Greatest Conservation Need in the Kansas Wildlife Action Plan, but that designation does not carry any regulatory protection. Given the paucity of recent observations of American Eels in the Kansas River Basin and the lack of state protective status applied to the species, our agency does not require any passage measures to be implemented at this time.

Thank you for the opportunity to provide these comments and recommendations. Please let me know if you have any questions or concerns about the preceding information.

Sincerely,

Jordan R Hofmeier

Jordan Hofmeier, Aquatic Ecologist
Ecological Services Section

United States Department of the Interior

FISH AND WILDLIFE SERVICE
2609 Anderson Ave
Manhattan, Kansas 66502

December 10th, 2019

In Reply Refer to:
FWS/R6

Sarah Hill-Nelson
The Bowersock Mills and Power Company
shn@bowersockpower.com

RE: Bowersock Low Impact Certification Letter from USFWS
FWS Tracking: 20-CPA-0056

Dear Ms. Hill-Nelson:

This letter is in reference to an email you sent November 14th, requesting a letter from the USFWS with recommendations regarding fish passage and any (federal) threatened or endangered species that could be impacted by Bowersock dam. You also asked if we had concerns regarding impingement or entrainment. The purpose of this request is to support your effort to be re-certified as a low impact hydroelectric dam.

There are no new federally listed species in that reach of the river since your last re-certification in 2015. There still is the possibility that the pallid sturgeon (*Scaphirhynchus albus*) could be found directly below Bowersock dam. Our last known records of them occurring directly below the dam was during flooding events in the 1950's. In recent times there have been nine records of pallid sturgeon below the Water One intake in Johnson County, Kansas. It is our opinion that continued operation of Bowersock dam is not likely negatively impacting the pallid sturgeon.

Bowersock dam most certainly impedes fish passage for a number of native and several non-native fish species. We have revisited this issue in 2019 with both KDWPT and USGS and have reached the conclusion that making changes to the current dam configuration in to promote fish passage would likely cause harm to the Kansas river and potentially associated reservoirs that are located above Bowersock. This recommendation is solely on the assumption that the dam has greatly slowed the spread of invasive Asian carp into the upper Kansas river basin, as well as the Smoky Hill and Republican rivers.

In your email you inquired if we had concerns regarding impingement or entrainment of fishes at the Bowersock hydroelectric facility. We are unaware of any information indicating that either of those two things are occurring at Bowersock dam. However, we would consider that to be a

data gap as we are under the impression that these types of issues have not been formally investigated at Bowersock dam, and would encourage future research regarding impingement or entrainment. We would note that the area immediately above the dam is impounded and more similar to that of a shallow lake than what the Kansas river was historically like and thus one would not expect imperiled riverine species to congregate directly above the dam.

Thank you for the opportunity to provide comment regarding the re-certification process. If you are in need of additional assistance or have questions please contact Gibran Suleiman of this office at 785-539-3474 ext 114.

Sincerely,

Jason Luginbill
Field Supervisor

cc: KDWPT, Pratt, KS (Ecological Services)

Appendix G – Cultural and Historic Resources

KANSAS KSR&C No. 09-06-205

MARK PARKINSON, GOVERNOR

Kansas Historical Society
Jennie Chinn, *Executive Director*

August 20, 2009

Stephen Hill
Owner/Operator
Bowersock Mills and Power Company
PO Box 66
Lawrence KS 66044

Re: Proposed North Shore Project
Bowersock Mills and Power Company
Douglas County

Dear Mr. Hill:

Our staff has reviewed the materials received August 13, 2009, regarding the above referenced project in accordance with 36 CFR 800. The SHPO has determined the proposed project will not adversely affect any property listed or eligible for listing in the National Register of Historic Places. Please refer to the Kansas State Review & Compliance number (KSR&C#) listed above on any future correspondence.

If you have any questions regarding this review, please contact Kim Norton Gant (785) 272-8681 ext. 225.

Sincerely,

Jennie Chinn
State Historic Preservation Officer

Patrick Zollner, Director,
Cultural Resources Division
Deputy State Historic Preservation Officer

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