

Memorandum to City Commissioners
The Bowersock Mills and Power Company
Re: Extension of Existing Maintenance Agreement Regarding the Bowersock Dam

Dear Commissioners and City Staff:

The Bowersock Mills and Power Company (BMPC) appreciates this opportunity to discuss the extension of the 1977 agreement between Bowersock and the City of Lawrence, under which the City has conducted maintenance of the Bowersock Dam between 1977 and the present. BMPC first proposed extension of this agreement in April of 2008, and we are hopeful that we will be able to initiate formal discussion and extend the agreement as soon as possible. We hope the background below and the attachments including a letter from KDOT and two spreadsheets detailing historic expenditures on the dam will be of assistance to you as you consider the extension of this agreement. The goal of the proposed extension is ensure the continued structural integrity of the existing dam.

The Bowersock Dam Performs Key Functions for the City of Lawrence and Other Stakeholders

1.) City of Lawrence Water Supply

The millpond formed by the Bowersock Dam provides a pool for the Kaw River Water Treatment Plant, which supplies approximately 50% of the City water supply on a daily basis.

- a. Optimum operation of the Kaw Plant takes place when the water is at flashboard height of 812' MSL. The Kaw intakes are operable at dam top height of 808' MSL, but it is less efficient and requires additional energy. Below 808' MSL, operations are significantly impacted.
- b. If the dam were removed, the Kaw Plant and intakes as currently structured would become inoperable, as the Kansas River at Lawrence would become a braided stream at most water levels, in particular in the low water summer months. Expansion of the Wakarusa Plant allows the City to meet most, but not all City demand at peak times.
- c. In 2001, the City of Lawrence studied options for providing an alternate method of water extraction (an alluvial well system), and the cost was found to be prohibitive.

2.) Kansas Department of Transportation (KDOT) Infrastructure

The KDOT bridges immediately upstream of the dam depend on the maintenance of the existing dam structure in order to maintain their structural integrity. KDOT has requested that the dam not be removed in order to protect existing bridge structures.

3.) University of Kansas - Boathouse

The University of Kansas recently completed a \$6 M boathouse which relies on the Bowersock Millpond with the flashboards up for appropriate water depths.

4.) Westar Energy – Lawrence Energy Center

Bowersock experience as well as a formal study completed by Olsson Associates indicates that the Westar Energy Center relies on the Bowersock Millpond in order to maintain appropriate water depths to draw water through its intakes at the Lawrence Energy Center (LEC). Although Westar has formally said that the Bowersock Millpond is “inconsequential” to the Westar LEC intakes, BMPC has concerns that removal of the Bowersock Dam and the severe streambed degradation that would accompany the removal of the dam will significantly impact the operations of the Westar LEC.

5.) The Bowersock Mills and Power Company

- a. Energy Production: BMPC depends on the Bowersock Dam for the production of a maximum of 2.35 MW of electricity on a daily basis. BMPC has the possibility to expand production at the Bowersock Dam through the construction of an additional plant on

the north side of the river with a capacity of approximately 5 MW of energy production. BMPC produces clean, renewable energy with zero carbon impacts. It is a stated goal of the State of Kansas and the United States Department of Energy to increase the production of renewable, non-polluting, domestic energy supplies in Kansas and for the United States.

- i. Without an extension of the agreement with the City, BMPC have to cancel plans for an increase in energy production.
 - ii. Hydropower infrastructure is highly capital intensive. With only 18 years remaining on the existing agreement, Bowersock would have to cease investing in the infrastructure of the existing South Plant with the end result of ending the operation of the plant.
- b. BMPC cannot financially support maintenance of the Dam.
BMPC is the Federal Energy Regulatory Commission (FERC) licensee for the Bowersock Dam. Bowersock does not generate the revenue (BMPC has offered to share books with the City regarding this issue) to support the primary maintenance of the Bowersock Dam. If the City does not commit to maintain the structural integrity of the existing Bowersock Dam, Bowersock will be unable to conduct that maintenance. If at any time FERC deems the dam to be structurally unstable, and there is no proposed remedy for the problem, **FERC will require decommissioning of the dam.**
- c. The BMPC/Lawrence Partnership is a valuable public/private partnership.
Since 1977, BMPC has supported approximately 46% of all costs to maintain the dam and preserve the millpond level at flashboard height of 812' MSL. (See attached spreadsheets.) Absent the BMPC partnership, in order to maintain the Dam, the City would have to shoulder the entire cost burden. Undoubtedly, BMPC is able to maintain the flashboards in a raised position for significantly less than it could be done by the City. With that in mind, without an extension of the agreement, the City would need to expect to an increase in dam maintenance expenses of more than 100% in order to keep the millpond at the appropriate level for the full operation of the Kaw River Water Treatment Plant.

The Bowersock Mills and Power Company and the City of Lawrence have had a long, mutually beneficial relationship that began in 1874 and continues to this day. The BMPC/Lawrence partnership allows for the sharing of costs to maintain a dam that provides water to the city, allows for the production of renewable energy, maintains existing bridge infrastructure, provides recreation opportunities in the project area, and maintains appropriate water levels for 600 MW of energy production at the Lawrence Energy Center. BMPC respectfully requests that the City Commission consider the extension of this important agreement for an additional 50 years beyond the life of the existing agreement to preserve these valuable community assets.

Kansas Department of Transportation

MEMO TO: Mark Bushouse, P.E.
Senior Engineering Manager
Black and Veatch Corporation

FROM: Michael J. Orth, P.E., CFM
Bridge Hydraulics Engineer
State Bridge Office, Kansas Department of Transportation

DATE: March 24, 2009

SUBJECT: Potential Impact to Highway Bridges 023-081 and 023-082
Due to Proposed Repairs at Bowersock Dam

Location: Highway US-40 Over the Kansas River
City of Lawrence, Kansas

The City of Lawrence plans to begin repair work on the Bowersock Dam across the Kansas River in downtown Lawrence this year. This letter provides KDOT requirements during the repair work to limit the impact to the highway bridges immediately upstream of the dam. The city has hired Black and Veatch Corporation to provide engineering services. The proposed work will primarily consist of repairs of the superstructure of the dam to reduce or eliminate flow-through. A causeway has been proposed by the city to provide dry conditions to perform the work and to assess the overall structural condition for more extensive in-depth repairs in the future. The causeway will be temporary and will be constructed upstream of the dam near the bridges.

Bridges 023-081 and 023-082 are within 400 feet of the dam and they carry an AADT of 11,650 on highway US-40. The bridges were built in 1978. They also carry several utility lines on the superstructure including a water supply line for north Lawrence. Both are two-lane, six-span steel welded plate haunched girder bridges with an overall length of 1,118 ft for bridge 023-081 and 1,114 ft for bridge 023-082. Bridge 023-082 carries northbound traffic and is nearest the dam.

Foundations for the two bridges are similar. Piers 1 and 2 at the south end of each bridge are concrete spread footings that bear on blue-gray hard shale approximately 8 ft. below the streambed elevation. Piers 4 and 5 at the north end of the bridges are sheetpile cofferdams about 19.5 ft. in diameter, driven to "shale, light-blue gray clayey, hard" as denoted on the plans. The pile tip elevations are approximately 764. Pier 3 is similar to Piers 1 and 2 except that it has a row of short steel H-pile along its north side. Also noted on the plans is a thin layer of limestone under the south end of the bridges that terminates between Piers 3 and 4.

The highway bridges are currently rated as scour critical and a loss of any portion of the dam could result in undermining of the foundations and failure of the bridges. If any portion of the dam fails during construction, KDOT needs to be contacted immediately and the bridges need to be closed to traffic until the KDOT Bridge Management Section can inspect the foundations and overall bridge condition.

An engineering hydraulic analysis of the reach should be performed to determine the forces that will be exerted on the dam during construction. The analysis should also include a scour evaluation of the bridge foundations. A structural assessment of the dam should be performed to determine the capacity of the dam during all phases of construction. The width of the main river channel should not be reduced by more than half of its width at any time to reduce the potential for contraction and local pier scour unless

To: Mark Bushouse
March 24, 2009
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engineering analysis can provide justification for doing so. The top of dam elevation should not be lowered below its existing 807.5 elevation for any portion of the dam under flow conditions during or after construction. Significant reduction of the waterway width or lowering of the top of dam elevation could result in higher scour potential at the upstream bridge foundations.

It is recommended that the repair work be done during times of seasonal low flow. It is also recommended that the City of Lawrence coordinate with the U.S. Army Corps of Engineers to keep upstream dam release rates as low possible during construction.

MJO: dta

by e-mail:

Jim Kowach, Bureau Chief, KDOT Bureau of Design
Kenneth Hurst, Engineering Manager, KDOT State Bridge Office
Clay Adams, District Engineer, KDOT District One
Robert Henthorne, Chief Geologist, KDOT Geology Section
Don Whisler, Bridge Management Engineer, KDOT State Bridge Office
Brad Rognlie, Senior Squad Leader, KDOT State Bridge Office



DEPARTMENT OF WILDLIFE AND PARKS

May 5, 2009

Kathleen Sebelius, Governor
J. Michael Hayden, Secretary

www.kdwp.state.ks.us

Track: 20020763

DG

Reference: D5.0303

Sarah Hill-Nelson
P.O. Box 66
Lawrence, KS 66044

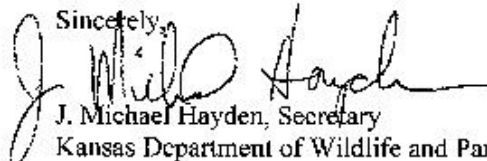
RE: *Bowersock Mills and Power Company Low Impact Status*

Dear Sarah Hill-Nelson:

Thank you for the opportunity to comment on the re-certification of Bowersock's operations as a Low Impact Hydropower Project. Like all impoundments, the many benefits of Bowersock dam must be weighed against potential negative environmental impacts. To date, potential environmental impacts of Bowersock have primarily centered on aquatic organism passage. In 2004, the Department recommended against installing a fish passage structure on Bowersock Dam due to concerns that the potential movement of invasive species (specifically species of Asiatic carp) upstream would be more detrimental than the potential benefits derived for native species. This recommendation was based on conversations with other state and federal agencies, as well as experts in the state and elsewhere.

Since 2004, discussions regarding fish passage on the Kansas River have continued among parties interested in the health of the Kansas River fish community. Based on these discussions, there appears to be increasing evidence that Bowersock does not function as a complete barrier to non-native organism passage as evidenced by the continued presence of Asiatic carp upstream of the dam. In addition, although the dam may not prevent all aquatic organism passage, it may obstruct movement of some native species sufficiently to prevent adequate distribution and reproduction within the river. For example, seasonally large numbers of migratory Blue Suckers (*Cycoreptus elongates*) tend to occur immediately below Bowersock.

At this time, the Department is not recommending construction of a fish passage structure in association with Bowersock Dam because sufficient information regarding benefits and detriments of such an action is not available. However, we hope that results of on-going and planned research will provide the information necessary to make an informed decision in the near future. If this new information indicates the dam does not prevent the spread of non-native species upstream and may hinder recovery of Threatened or Endangered species, the Department would recommend that a fish passage structure be considered for installation.

Sincerely,

J. Michael Hayden, Secretary
Kansas Department of Wildlife and Parks

OFFICE OF THE SECRETARY
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WATER LEVEL MAINTENANCE COSTS
BOWERSOCK DAM

JOB NAME	#OF WORKERS	ANNUAL HOURS	COST PER PERSON,PER HOUR	ANNUAL COST
administrative costs / regulatory / inspection	1	260	\$25.00	\$6,500.00
air compressor maintenance				\$3,000.00
air compressor use				\$6,000.00
cleaing debris from spillway gates	3	16 per month=192	\$25.00	\$4,800.00
crane maintenance/ inspection	3	40 hrs each=120	\$25.00	\$3,000.00
crane operator	1	20 hrs /month=240	\$25.00	\$6,000.00
debris management	3	30 hrs ea/month=1080	\$25.00	\$27,000.00
flashboard fabrication	2	3 hrs per door x 20=60	\$25.00	\$1,500.00
flashboard installation	2	4 hrs per door x 20=80	\$25.00	\$2,000.00
flashboard manipulation (4 x a year approx	3	16 hrs ea x 4 = 64	\$25.00	\$1,600.00
insurance / liability / flood/property	Liability \$7140.14	Flood \$3715.00	Property \$5202.48	\$16,057.62
workers compensation insurance				\$8,100.00
maintaning water level data	1	365	\$25.00	\$9,125.00
monitoring water levels	1	365	\$25.00	\$9,125.00
Obermeyer door monitoring / operation	1	365	\$25.00	\$9,125.00
Obermeyer maintenance	1	40	\$25.00	\$1,000.00
dam safety signage and property maintenanc	2	16 hrs ea x 2 = 32	\$25.00	\$800.00
sluice gate maintenance / operation	2	4 hrs weekly x 52=208	\$25.00	\$5,200.00
ANNUAL TOTAL				\$119,932.62

Bowersock Dam Public/Private Partnership
1977 - Present

ASSUMED INFLATION	3.0%								
YEAR		0	1	2	3	4	5	6	7
YEAR		32	31	30	29	28	27	26	25
CALENDAR YR		1976	1977	1978	1979	1980	1981	1982	1983

HISTORICAL SPEND

City of Lawrence Expenditures	3,443,946	0		1,000,000					
City of Lawrence Materials	129,780		0		3,387				
BMPC Expenditures	549,428	30,000		0					
BMPC Annual Maintenance	2,565,211	46,574	47,972	49,411	50,893	52,420	53,992	55,612	57,280
Total Expenditures	\$6,688,364	76,574	47,972	1,049,411	54,280	52,420	53,992	55,612	57,280

SPEND IN TODAY'S DOLLARS

Annual Expense in 2008 \$ **\$10,438,088** \$ 197,185 \$ 119,933 \$ 2,547,195 \$ 127,915 \$ 119,933 \$ 119,933 \$ 119,933 \$ 119,933

City of Lawrence Total **\$3,573,725.56**
BMPC Total **\$3,114,638.35**

Bowersock Dam Public/Private Partnership
1977 - Present

8	9	10	11	12	13	14	15	16	17	18
24	23	22	21	20	19	18	17	16	15	14
1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994

	0	25,000		0
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	102,690			25,000		278,280
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58,999	60,769	62,592		64,470		66,404		68,396		70,448		72,561		74,738		76,980		79,290
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58,999	60,769	62,592		167,160		66,404		68,396		70,448		72,561		74,738		126,980		357,569
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\$ 119,933	\$ 119,933	\$ 119,933		\$ 310,966		\$ 119,933		\$ 119,933		\$ 119,933		\$ 119,933		\$ 119,933		\$ 197,831		\$ 540,856
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Bowersock Dam Public/Private Partnership
1977 - Present

19	20	21	22	23	24	25	26	27	28	29
13	12	11	10	9	8	7	6	5	4	3
1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005

0	65,000					2,300,000				53,946
6,086	2,624	6,376	4,523	4,005	11,647	14,022	9,624	0	0	21,637
42,459	0					70,999				0
81,668	84,118	86,642	89,241	91,918	94,676	97,516	100,442	103,455	106,559	109,755
130,214	151,743	93,018	93,764	95,923	106,323	2,482,537	110,065	103,455	106,559	185,338

\$ 191,223 \$ 216,349 \$ 128,758 \$ 126,011 \$ 125,158 \$ 134,687 \$ 3,053,207 \$ 131,424 \$ 119,933 \$ 119,933 \$ 202,524

Bowersock Dam Public/Private Partnership
1977 - Present

30	31	32
2	1	0
2006	2007	2008

32,309	6,521	7,018
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113,048	116,439	119,933
145,357	122,960	126,951

\$ 154,209	\$ 126,649	\$ 126,951
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