

To: Diane Stoddard
Fax: 785-832-3405
Tel: 785-832-3000
From: Sarah Hill-Nelson
Bowersock Mills and Power Co.
Tel: 785-766-0884
Fax: 785-843-1385
Pages: Cover + 3

Message:

Diane,

I will put this together in a better format for the Power Point, but I wanted to fax this to you to give you a better description of our proposal. This description of proposed repairs could impact the paragraph related to "Request for larger maintenance project to commence in August."

I apologize that I did not state it this clearly before, but it occurred to me as we were speaking on the phone that this was a much better way to articulate our request as people will be able to better compare it to the currently-proposed repair. In order to better explain Bowersock's proposal, would it be possible to clarify Bowersock's request as follows: "... in favor of a larger project which would include items #2 and #3 from those proposed in the Short Term Repairs, and item #1 from those proposed in the Long Term Repairs identified By Black & Veatch in their 2007 report.

I can write them up separately, but I think it would possibly be more useful to see the pages from the actual B&V report than putting them in a separate document where they might not see the relationship to the work already completed.

Please let me know your thoughts on that.

Sincerely,


Sarah

BMPC Proposed Maintenance Project

<u>Project</u>	<u>B&V 2007 Cost</u>
Short-Term Repair #2: Fill Eroded Concrete Areas	\$ 100,000
Short-Term Repair #3: Repair Failed Shotcrete	\$ 20,000
Long-Term Repair #1: Seal the Upstream Face of the Dam	<u>\$7,500,000</u>
Total Project Cost:	<u>\$7,620,000</u>

Page 6 of 9

Lawrence, Kansas
Ms. Mary Baker

B&V Project 146136
February 14, 2007

Short-term Repairs

The following repairs should be completed immediately to limit further degradation of the structure.

- This repair will be addressed in "Long-Term Repairs #1"*
1. Repair Leaks in Dam Between Stations 3+25 and 3+00. In order to stop the flow through the dam between Stations 3+25 and 3+00, additional grout bags and tremie concrete will need to be installed upstream of the dam to reduce the amount of flow through the dam to a point such that the large voids can be plugged and filled with pea-gravel or pea-gravel grout from downstream. It will likely be necessary to drill several injection holes on the downstream side of the dam in order to fill the voids in the concrete superstructure and the upper portion of the cribbing beneath the concrete superstructure. Because the severity of flow through the dam is variable along the length of the dam, it is difficult to accurately estimate the number of injection holes and volume of concrete required to fill these subsurface voids, but an effort has been made. The opinion of probable project cost for this activity is \$200,000. Should these repairs not result in complete stoppage of the flow through the dam, consideration of additional work on the upstream face of the dam to create an upstream seal will need to be evaluated.

2. Fill Eroded Concrete Areas. There are several sections that the concrete surfacing has been eroded away over time to expose steel reinforcing and timber cribbing. These areas can be filled with mass concrete, and where the surface void is large enough, reinforcing could be drilled and grouted into place to assist in tying the new concrete into the existing structure. It is difficult to accurately estimate the volume of concrete required to fill these subsurface voids, but an effort has been made. The opinion of probable project cost for this activity is \$100,000.

3. Repair Failed Shotcrete. There is a minor amount of shotcrete that has eroded away from the last repairs to expose the wire reinforcing mesh. These areas should be spot patched with a grout pack to avoid failing more of the dam face. The opinion of probable project cost for this activity is \$20,000.

Long-term Repairs

The following areas should be monitored on a routine basis and repaired, as needed, to avoid the continued development of more critical problems.

1. Seal the Upstream Face of the Dam. The repairs using grout bags and tremie concrete are considered only temporary. Long term repairs should consist of methods to completely restore the upstream face of the dam to prevent leakage. The water flow through the dam

Page 7 of 9

Lawrence, Kansas
Ms. Mary Baker

B&V Project 146136
February 14, 2007

needs to be stopped to prevent degradation to the dam interior not visible during inspections. Because the dam is a gravity dam, it relies on the interior cribbing and rockfill for its stability. Degradation of cribbing and movement of rockfill can go undetected for a long time and is a cause for concern for long term stability of the dam. The upstream seal must be restored before making any required repairs to the interior of the dam. The repairs needed to the dam interior would require further intrusive investigations after the upstream face is sealed off. In order to create a seal on the upstream face of the dam, some sort of cofferdam would need to be constructed upstream to allow dewatering and exposing of the upstream face of the dam. It would be extremely difficult to install a row of sheet piling or an earthen causeway on the upstream side of the dam to hold back the water and excavate in front of the dam. Previous repairs made in 1979/1980 involved the placement of several layers of riprap and an impervious clay layer upstream of the dam to a point where the work intersected the causeway installed for the construction of the Massachusetts Street Bridge. Therefore, efforts to drive sheet pile directly in front of the dam would likely be hampered by the existing riprap. The cost and type of construction required in order to provide a self supporting sheetpile structure that would allow the area in front of the dam to be dewatered would be significant enough that the work could be used to replace the dam. The opinion of probable project cost for this activity is \$7,500,000.

2. Complete Sheet Piling Downstream of Dam. Approximately 300 feet of downstream repair work was not completed in 2002. To complete stabilization of the dam, the remainder of the sheet piling, riprap, and apron repairs should be completed. This portion of the riverbed has been eroded significantly due to the continued operation of the pneumatic flashboards that that created a plunge-pool which has allowed the underlying shale to be eroded and scoured. The opinion of probable project cost for this activity is \$3,000,000.
3. Automate Existing Spillway Gates. The existing pneumatic gates are operated to control the pool level behind the dam because of their controllability. However, this operation allows for continued erosion of the riverbed at this location, whereas, if the existing gates were automated, the spillway could be utilized to control the pool level behind the dam and dissipate the energy on the concrete spillway, rather than continue to allow the water to cascade over the dam. This operation would require the continued maintenance of the upstream channel to remove debris that is collected in this area. If the City were to provide the maintenance necessary to keep the upstream channel clean on a regular basis, this would provide incentive for Bowersock to stop relying on the use of the pneumatic flashboards, resulting in less erosion. The opinion of probable project cost for this activity is \$400,000.
4. Construct Downstream Nappe and Energy Dissipaters. The condition, means and methods, as well as the materials of construction of the existing dam are largely unknown due to the age of the structure, phasing of construction, and repairs that have occurred throughout the