*"Protecting the public health and natural resources of the White River watershed through advocacy, education, and research"*

WHITE RIVER WATERKEEPER®

870-577-5071 (phone) | jessie@whiteriverwaterkeeper.org (email)
P.O. Box 744, Harrison, AR 72602
***www.whiteriverwaterkeeper.org***

15 October 2019

Secretary Becky Keogh
Arkansas Department of Energy and Environment
Division of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118

**RE: Conceptual Closure Plan for C&H Waste Storage Ponds; AFIN 51-00164; Permit ARG5900001**

Dear Secretary Keogh,

Thank you for the opportunity to provide input on the conceptual closure plan. This public engagement process will undoubtedly aide in developing a final closure plan that is adequately protective of the sensitive karst resources throughout the Buffalo River watershed.

## I. The closure plan must meet the requirements of waste facility closure standards outlined in the existing permit.

The conceptual plan references Arkansas Pollution Control and Ecology Commission (APC&EC) Rule 5.701 for minimum closure plan requirements. C&H's administratively continued permit is covered under APC&EC Rule 6. Permit ARG590001 governs the applicable closure requirements, including the adherence to Natural Resource Conservation Service (NRCS) Conservation Practice Standard (CPS) Code 360.[1] [2]

Below, we have outlined requirements for plans and specifications detailed in NRCS CPS 360 into two categories: details included in the conceptual plan and details not included in the conceptual plan. This will help ensure the draft closure plan contains enough detail so that meaningful feedback can be provided through public comments.

**Minimum requirements included in Conceptual Closure Plan:**

- A plan view showing the location and extent of the practice.
- Pertinent elevations of the closed facility and excavation limits.

[1] See Part 1.9, page 4 of 33, ARG590001, https://www.adeq.state.ar.us/downloads/WebDatabases/PermitsOnline/NPDES/Permits/ARG590001.pdf
[2] NRCS Conservation Practice Standard Waste Facility Closure (Code 360), May 2019; https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1253367.pdf (accessed 14 October 2019)

**Minimum requirements NOT INCLUDED in Conceptual Closure Plan (i.e., need to be added to Draft closure plan):**

- Number, capacity, and quality of facility and estimate of soil and **waste volume to be moved.**
- Estimate of demolition quantities (concrete, etc.) to be removed or buried.
- Location of known utilities.
- Requirements for salvage and disposal of structural materials.
- Vegetative requirements.
- Utilization plan for animal wastes and soil. This may include the location and details for temporary storage of sludge or solids until properly removed from the site.
- Odor management or mitigation requirement.
- Safety plan requirements.
- Remove existing waste transfer components that convey waste materials to a treatment or storage facility and facility components that provide drainage from the waste facility. Replace transfer components with compacted earth material or otherwise render transfer components unable to convey waste.

## II. Additional monitoring is necessary to determine the extent of waste and contaminated soil to be removed and to track improvements in water quality post-closure.

A primary criterion of waste facility closure is to "remove all agricultural waste and associated material as much as deemed practicable that could negatively affect water or air quality or pose a safety hazard."[3] Water quality in Big Creek, and groundwater near the facility, **ARE** negatively impacted, indicating a strong association with the permitted facility.

Weight of evidence that pollution from C&H is negatively impacting water quality:[4]

1) Dissolved organic carbon has steadily increased in groundwater, influenced by C&H (**Figure 1**).[5] Note: the larger the organic carbon content, the more oxygen is consumed. A high organic content means an increase in the growth of microorganisms that contribute to the depletion of oxygen supplies. Anthropogenic sources of organic carbon often include animal feedlots.[6]
2) Big Creek and portions of the Buffalo River near the confluence with Big Creek are not meeting water quality standards for dissolved oxygen and bacteria. This translates to aquatic life being negatively impacted and waters not suitable for swimming (i.e., primary contact recreation).[7]

[3] NRCS CPS 360, https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1253367.pdf
[4] Statement of Basis for permit denial of 5264-W states "the record contains information that the operation of this facility may be contributing to water quality impairments of waters of the state." See p. 3, https://www.adeq.state.ar.us/home/pdfs/statement-of-basis-5264-w.pdf
[5] Data were compiled from Big Creek Research and Extension Team quarterly reports. https://bigcreekresearch.org/project_reports/default.aspx
[6] https://pubs.usgs.gov/sir/2006/5260/pdf/SIR2006-5260.pdf (accessed 14October2019).
[7] Draft 303(d) list, https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2018/2018-draft-list-public-notice.pdf.

3) Daily dissolved oxygen concentrations in Big Creek fluctuate significantly – consistent with streams and rivers affected by nutrient enrichment (Figure 2).[8] Dissolved oxygen and pH variability indicates a high level of primary production in Big Creek. Correlations between dissolved oxygen and specific conductance indicates influences from groundwater and agricultural runoff.[9]

**Additional monitoring should include:**

a) Grid soil sampling or soil borings after sludge and solids removal to measure nitrate and electrical conductivity to determine the extent of contaminant movement beneath the pond floors. The results will determine the extent of soil removal required and establish whether monitoring wells are needed.
b) Groundwater flow analyses to determine direction of subsurface transport.
c) Groundwater contamination analysis following Ohio's Resource Conservation and Recovery Act (RCRA) closure plan guidance.[10]
d) Microbial source tracking should accompany continued E. coli monitoring efforts. Pre-closure, waste samples should be collected to develop DNA primers to differentiate between domestic and feral swine. As long-term storage of pathogens in karst terranes are known to occur (Even et al., 1986;[11] Chapman et al., 1992;[12] Kaufman et al., 2003[13]), these data will provide valuable insight into how best to manage and regulate confined animal feeding operations on karst.

[8] Fluctuations greater than 3 mg/L has been identified as a useful water quality translator for assessing impacts of nutrients on water quality and aquatic life. See Table XIV, p. 48, 2016 Assessment Methodology. https://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2016/assessment-methodology.pdf

[9] Justus, B.G., Driver, L.J., Green, J.J. and Wentz, N.J., 2019. Relations of dissolved-oxygen variability, selected field constituents, and metabolism estimates to land use and nutrients in high-gradient Boston Mountain streams, Arkansas. *Environmental monitoring and assessment*, *191*(10), p.632. https://rdcu.be/bQ7yQ

[10] See Appendix D; https://epa.ohio.gov/Portals/30/RCRA/docs/Closure%20Plan%20Review%20Guidance.pdf

[11] Even, H.I., Magaritz, M., and Gerson, R., 1986, Timing the transport of water through the upper vadose zone in a karstic system above a cave in Israel: Earth Surface Processes and Landforms, v. 11, no. 2, p. 181–191, doi:10.1002/esp. 3290110208.

[12] Chapman, J.B., Ingraham, N.L., and Hess, J.W., 1992, Isotopic investigation of infiltration and unsaturated zone flow processes at Carlsbad Cavern, New Mexico: Journal of Hydrology, v. 133, no. 3–4, p. 343–363, doi:10.1016/0022-1694(92) 90262-T.

[13] Kaufman, A., Bar-Matthews, M., Ayalon, A., and Carmi, I., 2003, The vadose flow above Soreq Cave, Israel: a tritium study of the cave waters: Journal of Hydrology, v. 273, no. 1–4, p. 155–163, doi:10.1016/S0022-1694(02)00394-3.

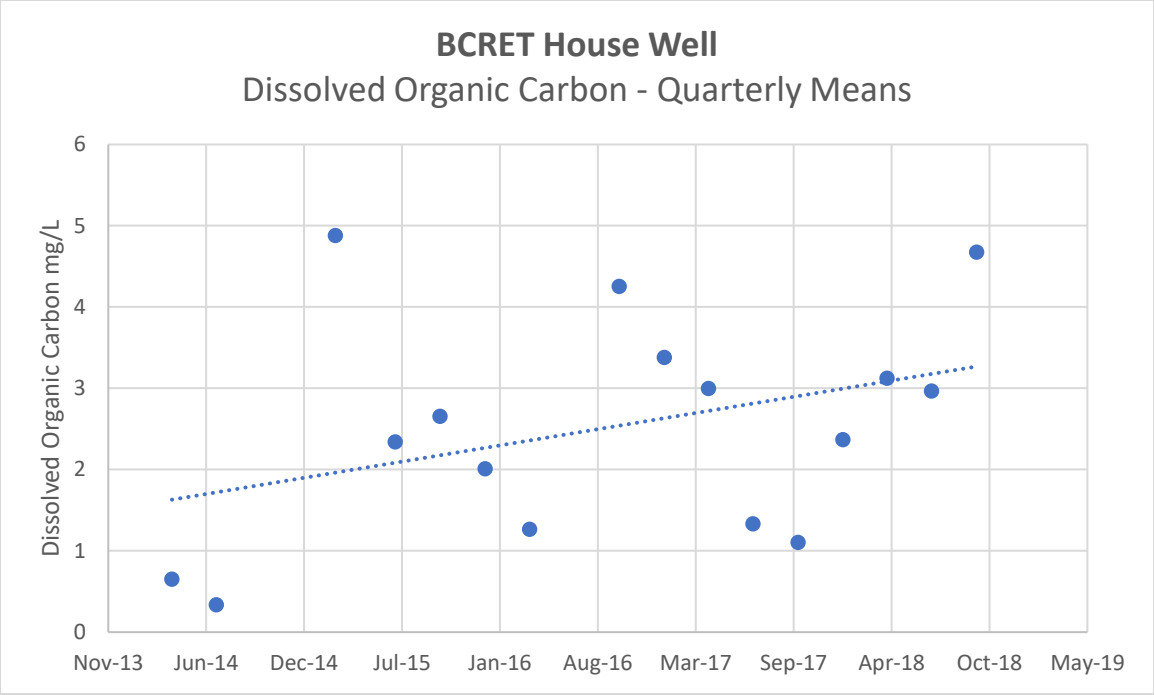



**Figure 1.** Big Creek Research and Extension Team (BCRET) dissolved organic carbon data collected at the house well, summarized by quarterly means from weekly collections April 2014-December 2018. Linear trendline added for reference purposes only.

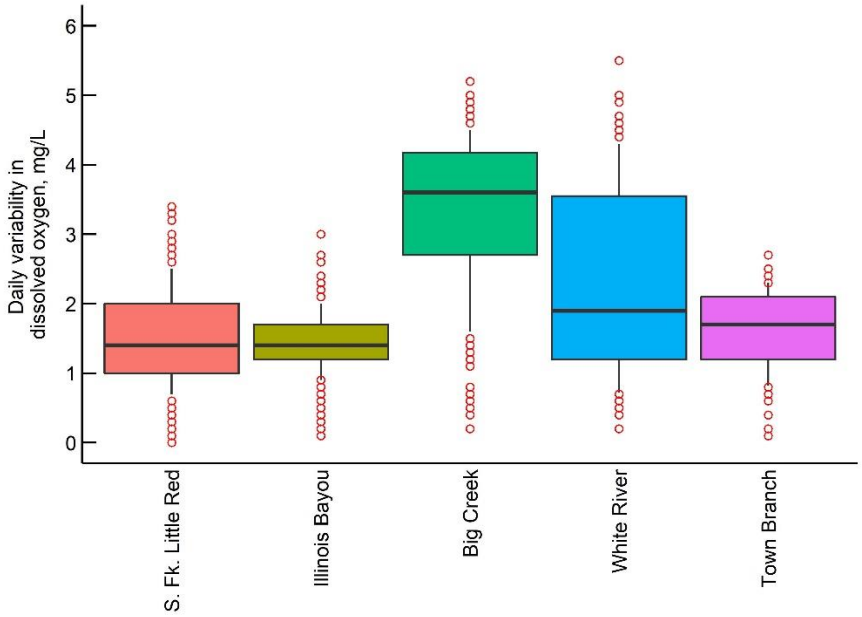
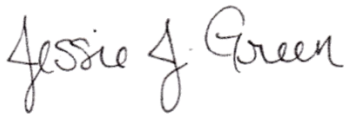



**Figure 2.** Box plots of the daily variability for continuous dissolved oxygen data collected when water temperatures exceeded 22 °C for five stream sites in the Boston Mountains, Arkansas. (Justus et al. 2019, Figure 3).

I believe we can all agree that taxpayers should never be responsible for paying for the permitting mistakes that jeopardize our fishable, swimmable, drinkable water. Through planning and action, we can learn through these mistakes and address regulatory and permitting failures that compromise Arkansas's karst resources and the communities and ecosystems that depend on their protection. To that end, we appreciate that no liquid or solid waste will be land applied within the Buffalo River watershed as part of this closure plan. This level of stewardship should extend to all of the sensitive waters in the state within karst terrain,[14] and none of the waste should be shifted to other equally as sensitive landscapes and watersheds.

We look forward to providing comments and feedback on the draft closure plan in the coming months.

Respectfully submitted,



Jessie J. Green
Executive Director & Waterkeeper

[14] See Figure 1, p. 5, Weary, D.J., and Doctor, D.H., 2014, Karst in the United States: A digital map compilation and database: U.S. Geological Survey Open-File Report 2014–1156, 23 p., http://dx.doi.org/10.3133/ofr20141156.