

UNITED STATES DISTRICT COURT
DISTRICT OF COLUMBIA

KARST ENVIRONMENTAL EDUCATION)
AND PROTECTION, INC.,)
WARREN COUNTY CITIZENS FOR)
MANAGED GROWTH, GAYLA CISSELL,)
JIM DUFFER and ROGER BRUCKER)
)
Plaintiffs) No. 1:05-cv-01190-RMU
)
v.)
)
U.S. ENVIRONMENTAL PROTECTION)
AGENCY,)
U.S. HOUSING AND URBAN)
DEVELOPMENT,)
and TENNESSEE VALLEY AUTHORITY)
)
Defendants.)

* * * * *

FIRST DECLARATION OF DR. KENNETH W. KUEHN

I, Dr. Kenneth W. Kuehn, make the following declaration based on personal knowledge, information, and belief:

1. Qualifications

a) I hold three academic degrees in Geology culminating in the PhD. I have been employed by Western Kentucky University since 1984 and my academic rank is that of tenured, Full Professor of Geology. My academic title is "University Distinguished Professor," which is the University's highest accolade for its faculty, awarded in recognition of my long-term and high-caliber achievements in geology research, education, and public service.

b) I am a registered professional geologist in the Commonwealth of Kentucky (KY- 2341) by having passed the National Association of State Boards of Geology (ASBOG) examination. Although as a university educator I am exempted by statute from the registration process in Kentucky, I pursued this minimal qualification because of

my external consulting and public practice of geology. I have been a part-time professional consultant for about 25 years, working with private industry and government agencies. I have just completed a one-year project with Mammoth Cave National Park and the Cumberland-Piedmont Network of national parks (CUPN) as consultant on their long-term ecological monitoring plan.

c) I am a recognized leader in the geology profession in the Commonwealth of Kentucky. I have held various elected offices with the Geological Society of Kentucky including that of its President in 1996. I was one of the founders of the Kentucky Society of Professional Geologists (KSPG) and was honored with its "Distinguished Service Award" in 1997. I have received several other awards and recognitions for my efforts in public service, in advancing the profession of geology, and in my role as a geology educator. Included among these is Western Kentucky University's 1998 Ogden College of Science and Engineering award for Public Service.

d) I have studied southern Kentucky's karst landscape, stratigraphy, and geologic structures since joining Western Kentucky University in 1984. I have been leading large groups of geologists on professional field trips that addressed the environmental concerns of the region's karst since 1994. I also have presented talks and published professional works dealing with the region's karst geology and related environmental concerns, including the Kentucky Trimodal Transpark, as follows:

2005. Karst Geomorphology and Environmental Concerns of the Mammoth Cave Region, Kentucky, American Institute of Professional Geologists, 42nd Annual Meeting, Lexington, KY, (guidebook in press)

2003. Earth System Science, Mammoth Cave National Park and the Proposed Kentucky Trimodal Transpark, Geological Society of America Annual Meeting, October 27-30, Seattle, WA, Abstracts with Programs, v. 34, no. 7, p. 147.

2003. Summary of the Geology and Hydrology of the Bowling Green Area Related to Planning of Interstate 66 Construction, Kentucky Geological Survey Technical Report to the Kentucky Department of Transportation, 7p., 8 map plates.

2003. Road Hazard Ahead: The Dishman Lane Karst Collapse, Bowling Green, KY, Geohazards in Transportation in the Appalachian Region, 3rd Annual Technical Forum, Lexington, KY.

2002. *The Kentucky Trimodal Transpark: A Mammoth Problem*, Annual Meeting of the Geological Society of America, Denver, CO, Abstracts with Programs, v. 34, no. 6, p. 259.

2002. *Geology and the Proposed Kentucky Trimodal Transpark*, Joint Annual Meeting, North-Central Section (36th) and Southeastern Section (51st) of the Geological Society of America, Lexington, KY. Abstracts with Programs, v.34, no.2, p.A-29.

2001. *Why on Earth Do They Want to Put It There? A Critique of the Site Selection Process for the Proposed Kentucky Trimodal Transpark*, Joint Annual Meeting of the Kentucky Academy of Science and the Tennessee Academy of Science, Murfreesboro, TN, Program and Abstracts.

1996. *Hydrogeology and Environmental Concerns of the Mammoth Cave Region*, Field Trip Guidebook for the 41st Midwest Groundwater Conference, Lexington, Kentucky, 33p.

1994. *Geomorphology and Environmental Problems of the Central Kentucky Karst*, Guidebook for Annual Field Conference of the Geological Society of Kentucky, Bowling Green, Kentucky, 50p.

I am providing this declaration as a volunteer and without compensation. I have read the Second Declaration of Nicholas Crawford, PH.D., P.G., dated August 18, 2005, and the Second Declaration of Mr. James Hizer, President of the Inter-Modal Transportation Authority (ITA), dated August 25, 2005.

2. Potential for Contamination of Mammoth Cave National Park by Spillover or Reverse Flow from the Barren River and Graham Springs Basin.

On July 26, 2001, seventeen other scientists and I signed a letter to Dan Cherry, then President of the Intevener ITA, that described and requested a rigorous hydrological assessment be performed on the Transpark site (Exhibit 1). The letter specified that storm pulse data, and modeling of high- and low-flow scenarios should be undertaken. The purpose of this letter was to protect the Mammoth Cave Conservation Area (MACA) from potential contamination from Transpark runoff, especially during periods of high discharge, which could result in groundwater leaking into the MACA underground drainage system, degrading its streams, and harming its rare/endangered species.

Subsequently, a study titled "Site Evaluation and Design Assistance for the Proposed Kentucky TriModal Transpark" was conducted and released on February 22, 2003,

by Dr. Nicholas C. Crawford. Although more detailed than previous commissioned works, it did not test groundwater flow during storm pulse or extreme high flow conditions. Thus, the question of potential contamination to MACA via leaky groundwater basin divides remains open.

I do not disagree that during normal flow conditions the subsurface streams draining the Transpark site, including the "Phase I" industrial park containing the TVA-funded Bowling Green Metalforming facility, emerge at Graham Springs on the Barren River. Graham Springs is one of the largest natural springs in Kentucky and is a potential future water supply for the growing City of Bowling Green. Its outflow affects water quality, natural habitats, and the rare and endangered species living downstream yet, to the best of my knowledge, no systematic studies have been undertaken to adequately characterize what is well known to be the "usual" situation for groundwater flow from the Transpark region.

It remains my professional opinion that the small, narrowly focused studies commissioned by Transpark proponents for the Transpark site are insufficient in their scope and detail of geological characterization to protect the public interest. The lack of public protection is especially true for extremely important off-site, surrounding areas including the Graham Springs and MACA as mentioned above.

3. Environmental Harm from Transpark Construction.

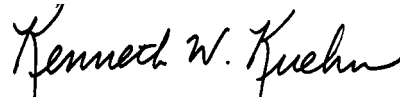
I disagree with the opinion of Dr. Nicholas C. Crawford (second declaration, para. 7) that there has been "...no measurable negative impact on Graham Springs." I personally observed large sinkholes being excavated and filled on the Transpark/Bowling Green Metalforming construction site, as well as extensive site grading and other disturbances made upon the landscape while it was entirely void of vegetation. I examined photographs of large piles of cave rock that had been removed from the near surface as part of the site preparation process. To the best of my knowledge, there has been no systematic offsite monitoring, no previous baseline data for comparison, nor any quantitative study of the water budget to ensure that the presumed groundwater basins and underground flow paths are consistent with the amounts of water and sediment observed moving through the system.

Therefore, his claim of "no measurable negative impact" cannot be supported.

According to the second declaration of James N. Hizer (para. 37) the planned system for controlling and treating stormwater runoff is not complete as of August 30, 2005, and if it is not completed, "...it is likely that groundwater under the Kentucky Transpark, and in the vicinity of the Transpark, will be fouled by unfiltered storm water runoff, causing irreparable damage to the environment." Construction activities at the Transpark have been progressing since at least February 2004, the Bowling Green Metalforming facility is complete and beginning its operation, roadways and other infrastructure have been installed, and all that work was done without benefit of the planned stormwater management system. If ceasing all work at this time would irreparably damage the environment as Mr. Hizer concedes, it is difficult to imagine that damage to the environment has not already occurred during the previous eighteen months of heavy construction activity.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 19th day of September, 2005.



KENNETH W. KUEHN

EXHIBIT 1

THE "19 KARST SCIENTISTS" JULY 26, 2001 LETTER TO THE
INTER-MODAL TRANSPORTATION AUTHORITY

1635 Grange Hall Road
Beavercreek, OH 45432
July 26, 2001

Mr. Dan Cherry
President
Intermodal Transportation Authority
2325 Airway Court, Suite C
P.O. Box 2001
Bowling Green, KY 42102-6001

Dear Mr. Cherry:

The controversy about whether the Graham Spring hydrologic drainage basin spills over into the Mammoth Cave drainage basin needs to be resolved before going ahead with the irreversible land acquisition for the KTT (Kentucky Trimodal Transpark) that your organization is planning to develop on the 4000 acre "Yellow Site" near Oakland, KY, six miles from Mammoth Cave National Park.

If the Graham Spring drainage basin spills over into the Mammoth Cave basin, the groundwater and its biota of Mammoth Cave National Park will be at risk in the event of pollution by spills or seepage from the industrial park and airport. Mammoth Cave National Park is a World Heritage Site, part of the International Biosphere Preserve, and a unique natural treasure. It is without question a valuable national resource that must be protected. Also, it is a regional economic resource that contributes an estimated \$100 million per year to the south central Kentucky economy.

You are reported as believing that underground drainage basin spillover is a "theory" and that "no significant evidence exists" to support spillover. The news story about your view appeared in the Bowling Green Daily News of July 20, 2001.

We, the undersigned, are karst scientists in the field of hydrology, geology, or biology. We are familiar with the scientific literature of underground stream tracing, and are generally familiar with the hydrology of the Sinkhole Plain and Mammoth Cave region. We have carried out field studies in karst areas and have evaluated the evidence of studies by other workers.

Four specific pieces of evidence support the drainage basin spillover conclusion. These are:

1. A dye trace by Quinlan and Ray. Dye was placed in Little Sinking Creek, a well-known karst swallow, during a high water stage. The creek flowed across Rocky Hill-Hayes Road and into a sinkhole where the dye was introduced to the underground system. Dye emerged at two locations, Turnhole Spring on the Green River, which is part of the Mammoth Cave drainage basin, and Graham Spring on the Barren River. This dye trace, which is mentioned in the ITA's published

Environmental Assessment on pages 4-36 and 4-50-51, demonstrates there is high stage hydrological communication between the two basins. White, William B. and E. White, Karst Hydrology; Concepts from the Mammoth Cave Area, Chapter 3, pp. 65-104, 1989. See also Quinlan, J. F., R. O. Ewers, and J. A. Ray, Groundwater Hydrology and Geomorphology of the Mammoth Cave Region, Kentucky, The Geological Society of Kentucky Field Trip Guide, 85 pp, 1983.

2. A dye trace by Quinlan and Ray. Dye was placed in a sinkhole about one mile north of Rocky Hill, KY. The dye emerged at two locations, Turnhole Spring on the Green River, which is part of the Mammoth Cave drainage basin, and Graham Spring on the Barren River. This dye trace, which is mentioned in the ITA's published Environmental Assessment on pages 4-36 and 4-50-51, demonstrates beyond dispute there is a hydrological communication between the basins. (White & White 1989.) (Quinlan et al 1983.)

3. Multiple dye traces by Quinlan and Ray and confirmed by Meiman. Dye was introduced in the underground Logsdon/Hawkins River in the Turnhole Spring drainage basin. The dye emerged from Turnhole Spring and from Roaring River/Echo River Spring during a rise of >3m of Logsdon/Hawkins River. The spillover water passed through an overflow route to Roaring/Echo River. These dye traces demonstrate a spillover from one basin to another adjacent to the Graham Spring basin during elevated stages of the Green River pool. Given the three dimensional network of openings, consisting of vertical shafts and horizontal tubes and canyons in the Central Kentucky Karst, this finding is not unusual. (Meiman, J. and M.T. Ryan, The Echo River-Turnhole Bend Overflow Route, CRF Newsletter, v. 21, no.1, 1993.)

4. A dye trace by Meiman during low stage conditions has demonstrated continuous leakage from the Logsdon/Hawkins basin into the Turnhole Spring basin regardless of river stage. This preliminary finding suggests that continuous leakage between basins is possible. (Meiman, J, C.G. Groves, and S. Herstein, In-Cave Dye Tracing and Drainage Divides in the Mammoth Cave Karst Aquifer, Kentucky, U.S. Geological Survey Karst Interest Group Proceedings, St. Petersburg, FL, pp. 179-185, 2001.)

Dr. Arthur N. Palmer reported to you in his letter dated May 2, 2001, p. 2, his observations related to seepage along beds in caves of the Graham Spring basin: "The Groundwater map of Quinlan and Ray shows the Oakland site to be at least 4 miles from the nearest divide to the north. This might seem a wide safety margin against leakage into basins to the north. But divides determined from piezometric data are valid only at the water table – not for water above the water table. Seepage above the water table is highly concordant with the bedding, because it follows bedding-plane partings, rather than fractures (which are poorly developed in the area). As the water drains downward, it follows the dip (tilt) of the beds, which the geologic map shows to be toward the northwest at Oakland. But very precise geologic mapping with an engineer's level that I have conducted in Cave Springs Cave, near Smiths Grove, shows that the actual dip varies enormously in its local direction and degree of tilt. These variations cannot be detected from surface mapping because outcrops are scarce and elevations used

by geologic mappers are generalized from contour lines on topographic maps. Descending water of this sort can travel down the tilt of the strata for several miles. Specific examples have been mapped in Mammoth Cave and other caves of the region.

"With more than 160 ft of depth to the water table around the Oakland site, contaminated water could travel down the local dip (less than 0.5 degree) with a horizontal component as much as 20,000 feet. This is roughly equivalent to the estimated distance to the northern limit of the Graham Spring basin. In other words, contaminated seepage could cross over the rather uncertain divides between basins. Although it is unlikely that such seepage could enter the Mammoth Cave drainage in this way, it has been amply noted by Park Service hydrologists that the divides shift with stage - i.e. the low flow divides do not coincide with those at higher flow levels. Stating that the drainage from the Oakland site is confined to the Graham Spring basin is not appropriate without further dye traces at a variety of flow stages."

Based on our understanding of the evidence, it is certain that hydrologic communication does take place between the basin in which the KTT is sited and an important Mammoth Cave National Park groundwater basin. What is NOT certain are the conditions under which spillover and seepage will occur and the extent of probable risk. Mammoth Cave National Park is too valuable to allow speculation about this issue to remain unresolved.

You are on record in "The Meeting Place" of April 12-26, p 3 as saying about the Transpark, "We enter each phase of this with an open mind. If a credible environmental study were done that said we shouldn't build this type of facility on this particular location we wouldn't do it. It's just that simple."

Therefore, we strongly urge that the ITA undertake a comprehensive, professional, hypothesis-based investigation of the circumstances and characteristics of groundwater movement in the area between the KTT and Mammoth Cave National Park to put all doubt and conjecture to rest. We understand the FAA requires a full-fledged EIS study before proceeding, and that the ITA has agreed to conduct such a study. The rigorous hydrological assessment using piezometric methods, storm pulse data, and modeling of high and low stage scenarios as described in this letter must be a part of that study.

Sincerely,
Signature

Title/Affiliation/Verification

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662-325-8774

Geary Schindel, Chief Technical Officer, Edwards Aquifer Authority , 210-222-2204

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Joseph H. Fagan, Karst Protection Specialist, Virginia Dept. of Conservation & Recreation, 540-953-1643

William B. White, Professor of Geochemistry, Penn. State University, 814-865-1152

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Copies to:
National Park Service
Federal Aviation Administration

Fish and Wildlife Service
Senator Mitch McConnell
Bowling Green Daily News
The Louisville Courier-Journal