



Carbon Sequestration Cliffhanger

Kathy Sykes thinks scientists must be good communicators. As Professor of the Sciences and Society at the UK's Bristol University, she's keen to raise awareness and public participation in academic research, and help researchers to get involved in talking with the public.

So what was this erudite Brit doing suspended off a cliff 1,000 feet above Buckhorn Wash? If your job is to find a vivid way to explain the science behind carbon capture and sequestration, then rappelling down a sheer face of Wingate sandstone in the middle of Utah's San Rafael Swell makes perfect sense.

Last weekend, Sykes was in red rock country as part of a British Broadcasting Corporation (BBC) crew filming a documentary on climate change. As part of the shoot, Sykes spoke with Dr. Brian McPherson, an associate professor of Civil and Environmental Engineering at the University of Utah and a USTAR faculty member.



McPherson is spearheading a multi-state project testing the feasibility of geologic sequestration of carbon dioxide (CO₂). In simple terms, the Southwest Partnership on Carbon Sequestration seeks to test the idea that the CO₂ burned at power plants can be pumped thousands of feet underground and stored safely away from the atmosphere. One of the best places in the world to sequester CO₂ may turn out to be the Colorado Plateau – home of Wingate, Kayenta, Navajo, Moenkopi and other dramatic strata known to visitors enjoying Utah's public lands.

Carbon capture and sequestration (CCS) is one of several technologies to mitigate global warming that the BBC is highlighting in the documentary. There are numerous CCS projects taking place worldwide, but McPherson's efforts – partially supported by USTAR – have made significant progress.

“With three active injection sites and a fourth commercial-scale test located in the Farnham Dome formation near Price coming online soon, the Southwest Project is as far along or farther than any CCS project in the world,” McPherson said.

Director Arif Nurmohamed indicated that the degree of progress is what caught the BBC’s eye, and underscored the urgency of the work. “If you accept that climate change is a problem and that we are partially to blame through our CO2 emissions, then the work Brian is doing is very important,” said Nurmohamed. “If his tests are successful, then carbon sequestration in geologic formations gives us a bridging technology to manage CO2 emissions while we reduce our need for fossil-fuel based energy.”

Sykes agrees, if for geopolitical reasons as much as anything. “I strongly feel we must develop renewable energy resources to scale as quickly as possible,” she said. “However it may not be practical or fair to expect nations like China to stop burning coal. Should the technology Brian’s team is testing prove out, there may be considerable geologic infrastructure near oil, gas and coal production areas that can safely keep greenhouse gases out of the atmosphere. That will benefit people the world over.”



Educating the public on science can be an art. The challenge for the BBC? Translating complex processes taking place below hidden strata of sandstone thousands of feet below Farnham Dome into something the public can understand. The solution? Find a place where the same strata are exposed to view. The cliffs of Buckhorn Wash were dramatic “stunt doubles” for the unseen layers below Price. Nothing says “secure storage” like hundreds of feet of varnished Wingate rock, especially when your narrator calmly explains the technical aspects while dangling in seeming danger.

As a side note, Sykes expressed deep appreciation for her climbing support experts, some of whom are members of the Emery County Search & Rescue team. “The guys were great, extremely competent, and their care and attention to safety made me feel comfortable throughout. It was a walk in the park, 90 degrees off angle.”

The BBC filmed a second scene at Crystal Geyser south of Green River, UT. The major danger to Sykes and McPherson at that location was merely to be splashed by the cold geyser, which typically spews water 20 feet in the air twice a day. The fountains of water are propelled by gas escaping from a natural CO2 reservoir that a 1930s oil well hit. (The well was improperly capped when it was closed.) The Crystal Geyser was the perfect background for a discussion of potential safety and liability issues concerning CCS.

According to McPherson, computer models indicate very low risk of any industrially sequestered CO₂ ever escaping to the surface. “But that’s why we are running a production-level test at Farnham Dome. Computer models are great, but there’s no substitute to testing in actual field conditions,” he said.

Acknowledging Sykes’ passion for public discussion of scientific issues, McPherson sees value in appearing on camera. “Highlighting our CCS project in these documentaries is a great way to educate the public. It’s important for people to know the kind of critical work that’s happening at the University of Utah and USTAR.”

USTAR’s executive director Ted McAleer concurs. “It’s gratifying that Utah-based scientists working on a USTAR project are recognized as leaders in the field. There are some dynamic efforts on carbon management happening in Europe, so the fact that the BBC traveled to Utah when they could have stayed closer to home demonstrates that Brian’s team is doing work of global significance.”

The documentary will air in Europe on BBC1 in December. A similar version will appear on the Discovery Channel in the U.S.

The Utah Science Technology and Research initiative (USTAR) is a long-term, state-funded investment to strengthen Utah's "knowledge economy" and generate high-paying jobs. Funded in March 2006 by the State Legislature, USTAR is based on three program areas. The first area involves funding for strategic investments at the University of Utah and Utah State University to recruit world-class researchers. The second area is to build state-of-the-art interdisciplinary facilities at these institutions for the innovation teams. The third program area involves teams that work with companies and entrepreneurs across the State to promote science, innovation, and commercialization activities. For more information, go to www.innovationutah.com.

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